

Form Approved
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UNITED STATES ENVIRONMENTAL PROTECTION AGENCY

Comprehensive Assessment Information Rule

REPORTING FORM

When completed, send this form to:

Document Processing Center
Office of Toxic Substances, TS-790
U.S. Environmental Protection Agency
401 M Street, SW
Washington, DC 20460
Attention: CAIR Reporting Office

For Agency Use Only:

Date of Receipt:

Document
Control Number:

Docket Number:

| COMMON 1 CONTRACT MANUFACTURED THROUGH AND PROCECOD INFORMATION |
|---|
| SECTION 1 GENERAL MANUFACTURER, IMPORTER, AND PROCESSOR INFORMATION |
| PART A GENERAL REPORTING INFORMATION |
| 1.01 This Comprehensive Assessment Information Rule (CAIR) Reporting Form has been |
| completed in response to the Federal Register Notice of $[\frac{1}{1}]2$ $[\frac{1}{2}]2$ $[\frac{1}{2}]2$ $[\frac{1}{8}]8$ $[\frac{1}{8}]8$ |
| [_] a. If a Chemical Abstracts Service Number (CAS No.) is provided in the Federal |
| Register, list the CAS No $[0]2]6]4]7]1]-[6]2]-[5]$ |
| b. If a chemical substance CAS No. is not provided in the <u>Federal Register</u> , list either (i) the chemical name, (ii) the mixture name, or (iii) the trade name of the chemical substance as provided in the <u>Federal Register</u> . |
| (i) Chemical name as listed in the rule N/A |
| (ii) Name of mixture as listed in the rule |
| (iii) Trade name as listed in the rule |
| c. If a chemical category is provided in the Federal Register, report the name of the category as listed in the rule, the chemical substance CAS No. you are reporting on which falls under the listed category, and the chemical name of the substance you are reporting on which falls under the listed category. Name of category as listed in the rule |
| |
| CAS No. of chemical substance [_]_]_]_]_]_]_]_]_]_[_] |
| Name of chemical substance |
| 1.02 Identify your reporting status under CAIR by circling the appropriate response(s). |
| <u>CBI</u> Manufacturer |
| [] Importer 2 |
| Processor |
| X/P manufacturer reporting for customer who is a processor 4 |
| X/P processor reporting for customer who is a processor |
| |
| |
| |
| |
| [] Mark (X) this box if you attach a continuation sheet. |

| 1.03 CBI | Doe in | es the substance you are reporting on have an "x/p" designation associated with it the above-listed Federal Register Notice? |
|---------------------|--------------|--|
| | | s |
| | No | |
| 1.04 <u>CBI</u> [_] | | Do you manufacture, import, or process the listed substance and distribute it under a trade name(s) different than that listed in the Federal Register Notice? Circle the appropriate response. Yes |
| | | Sheet page 1 |
| | | |
| | | |
| | | You have submitted the trade name(s) to EPA one day after the effective date of the rule in the Federal Register Notice under which you are reporting. |
| 1.05 CBI | If y | you buy a trade name product and are reporting because you were notified of your orting requirements by your trade name supplier, provide that trade name. |
| | Trad | de name Rubinate TDI 80/20 |
| ı, | Is t | the trade name product a mixture? Circle the appropriate response. |
| | Yes | *************************************** |
| | No . | |
| | Cert sign | ification The person who is responsible for the completion of this form must the certification statement below: |
| <u>BI</u> | "I h | ereby certify that, to the best of my knowledge and belief, all information ered on this form is complete and accurate." |
| - | Gary | y G. Maxwell NAME SIGNATURE DATE SIGNED |
| - | Env | ironmental Coordinator (301) 392-4800 TITLE TELEPHONE NO. |
| X] Ma | rk (| (X) this box if you attach a continuation sheet. |

| 1.07 <u>CBI</u> [_] | Exemptions From Reporting If you have provided EPA or another Federal agency with the required information on a CAIR Reporting Form for the listed substance within the past 3 years, and this information is current, accurate, and complete for the time period specified in the rule, then sign the certification below. You are required to complete section 1 of this CAIR form and provide any information now required but not previously submitted. Provide a copy of any previous submissions along with your Section 1 submission. | | | | |
|---------------------------|--|--|---|---|--|
| | "I hereby certify that, to the information which I have not in to EPA within the past 3 years period specified in the rule." | cluded | in this CAIR Reporting For | m has been submitted | |
| | (N/A) | | | | |
| | NAME | | SIGNATURE | DATE SIGNED | |
| | TITLE | (| TELEPHONE NO. | DATE OF PREVIOUS SUBMISSION | |
| <u>CBI</u> | "My company has taken measures and it will continue to take th been, reasonably ascertainable using legitimate means (other tajudicial or quasi-judicial prinformation is not publicly ava would cause substantial harm to | to prote ese meas by other han disc oceeding ilable | ect the confidentiality of sures; the information is persons (other than gove covery based on a showing of g) without my company's con elsewhere; and disclosure | not, and has not rnment bodies) by of special need in nsent; the of the information | |
| | NAME | | SIGNATURE | DATE SIGNED | |
| | TITLE | (| TELEPHONE NO. | | |
| | | | | | |
| | | | | | |
| | | | | • | |
| [<u></u>] H | ark (X) this box if you attach a | a contin | uation sheet. | | |

| PART | B CORPORATE DATA |
|------------|--|
| 1.09 | Facility Identification |
| <u>CBI</u> | Name []P]]]]]]]]]]]]]]]]]]]]]]]]]]]]]]]]]]] |
| | $[\underline{\overline{E}}]\underline{\overline{L}}]\underline{\overline{K}}]\underline{\overline{J}}\underline{J}}\underline$ |
| | $ \begin{array}{c c} $ |
| | Dun & Bradstreet Number [0]7]-[6]1]9]-[1]5]1]9 EPA ID Number MDD [9]8]1]1]0]6]0]8]1] Employer ID Number 2.[1]9]2]1]4]8]1]5] Primary Standard Industrial Classification (SIC) Code [2]8]2]1] Other SIC Code [1]1]1]1 Other SIC Code [1]1]1]1 |
| 1.10 | Company Headquarters Identification |
| <u>CBI</u> | Name [] P]]] A]] D] [] V] [S] [] O] N]] O] E] [] P] M] C] [] I] N] C] Address [5] O] 5] [B] L] U [E] [] B] A] L] L] [] [R [D] [P] O] B] O] X] [] 7] O Street City |
| | [M]D] [2]1]9]2]1][0]0]7]0 Dun & Bradstreet Number [0]7]-[6]1]9]-[1]5]1]9] Employer ID Number 2.[1]9]2]1]4]8]1]5] |

| 1.11 | Parent Company Identification | | |
|-------------|---|--|--|
| <u>CBI</u> | Name $[P]MC]$, $[D]MC]$, $[D]$ | | |
| | (S)U)N)_)V)A)L)L)E)Y)_]_] City | 1_1_1_1_1_1 | |
| | [C]A] State | [9]]]3]5] <u>7</u>] Zi | [<u> </u>] <u>3</u>] <u>6</u>] <u>7</u> |
| | Dun & Bradstreet Number |]_]-[6]_]] | -[_[5]_]0 |
| 1.12 | Technical Contact | | agayar ay aran a san |
| (<u></u> 1 | Name [G]A]R]Y] G]M]A]X]W]E]L]L]]] Title [E]N]V]I]R]O]N]M]E]N]T]A]L] C]O Address [5]0!5] B]L]U E] BALL L]R Street | JOJDJIJNJAJ | T]0]R]_] |
| 1. | (E) L) K) T) O) N)]]]]]]]]]] City |]_]_]_]_] [<u>2][]9]2][</u>] | |
| · | [M]D] State Telephone Number | Zi | P |
| 1.13 | This reporting year is from | $\begin{bmatrix} \overline{1} \\ 8 \end{bmatrix} \begin{bmatrix} \overline{8} \\ 8 \end{bmatrix}$ to | Mo. Year |
| | | | |
| | | | |
| | | | |
| | | | |
| | | | |
| [] ! | Mark (X) this box if you attach a continuation sheet. | | |

| 1.14 | Facility Acquired If you purchased this facility during the reporting year, provide the following information about the seller: |
|------------|---|
| CBI [_] | Name of Seller [_]_]_]_]_]_]_]_]_]_]_]_]_]_]_]_]_]_]_] |
| | (N/A) [_]_]_]_]_]_]_]_]_]_]_]_]_]_]_]_]_]_]_] |
| | [_]_] [_]_]_]_]_][_]]_]_]_] State |
| | Employer ID Number |
| | Date of Sale |
| | Contact Person [_]_]_]_]_]_]_]_]_]_]_]_]_]_]_]_]_]_]_] |
| | Telephone Number |
| 1.15 | Facility Sold If you sold this facility during the reporting year, provide the following information about the buyer: |
| <u>CBI</u> | Name of Buyer []]]]]]]]]]]]]]]]]]]]]]]]]]]]]]]]]]]] |
| | Mailing Address [_]_]_]_]_]_]_]_]_]_]_]_]_]_]_]_]_]_]_] |
| | (N/A) ([]]]]]]]]]]]]]]]]]]]]]]]]]]]]]]]]]]]] |
| | [_]_] [_]_]_][_]_]_]_]_] |
| | Employer ID Number |
| | Date of Purchase |
| | Contact Person [_]_]_]_]_]_]_]_]_]_]_]_]_]_]_]_]_]_]_] |
| , | Telephone Number |
| | |
| | |
| [_] | Mark (X) this box if you attach a continuation sheet. |

| Classification | Quantity (kg |
|--|--------------|
| | |
| Manufactured | <u>N/A</u> |
| Imported | N/A |
| Processed (include quantity repackaged) | 142_083 |
| Of that quantity manufactured or imported, report that quantity: | |
| In storage at the beginning of the reporting year | <u>N/A</u> |
| For on-site use or processing | <u>N/A</u> |
| For direct commercial distribution (including export) | N/A |
| In storage at the end of the reporting year | N/A |
| Of that quantity processed, report that quantity: | |
| In storage at the beginning of the reporting year | 17,398 |
| Processed as a reactant (chemical producer) | |
| Processed as a formulation component (mixture producer) | |
| Processed as an article component (article producer) | |
| Repackaged (including export) | |
| In storage at the end of the reporting year | |
| In Storage at the end of the reporting year | |
| | 7 |
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| · | |

| Supplier | Ave | <u></u> |
|----------|----------|---|
| Name | (specify | rage % on by Weigh precision, 45% ± 0.5%) |
| • | | |
| | | |
| | Total | 100% |
| | | 2004 |
| | | |
| | | |
| | · | |
| | | |
| | | |
| | | |
| | | Total |

| 2.04 | State the quantity of the listed substance that your facility manuf or processed during the 3 corporate fiscal years preceding the repo descending order. | actured, import rting year in | ed |
|-------------|---|---|----------------|
| <u>CBI</u> | | | |
| [_] | Year ending | $ \frac{1}{1} \frac{1} \frac$ | |
| | Quantity manufactured | N/A | k |
| | Quantity imported | N/A | k, |
| | Quantity processed | | |
| | Year ending | [1] 2] [8] Mo. Yea | $\frac{6}{ar}$ |
| | Quantity manufactured | N/A | kį |
| | Quantity imported | N/A | kį |
| ٠ | Quantity processed | 173,282 | kį |
| > | Year ending | [1]2] [8] Mo. Yea | <u>5</u> |
| | Quantity manufactured | N/A | kį |
| | Quantity imported | N/A | kį |
| | Quantity processed | 220,190 | k٤ |
| 2.05 CBI | Specify the manner in which you manufactured the listed substance. appropriate process types. | Circle all | |
| [_] | Continuous process | | . 1 |
| | Semicontinuous process | | |
| | Batch process | | |
| | | | |
| | | | |
| | | | |
| | • | | |
| [_] | Mark (X) this box if you attach a continuation sheet. | | |
| | - | | |

| 2.06 CBI | Specify the manner in appropriate process type | which you processed t pes. | he listed substance. | Circle all |
|--------------------|---|--------------------------------|-------------------------|-----------------------------|
| [_] | Continuous process Semicontinuous process Batch process | ••••• | ••••• | |
| 2.07 <u>CBI</u> | State your facility's resubstance. (If you are question.) N/A Manufacturing capacity Processing capacity | e a batch manufacture | r or batch processor, | do not answer this kg/yr |
| 2.08 CBI | If you intend to increa manufactured, imported, year, estimate the increase volume. | or processed at any | time after your curre | nt corporate fiscal |
| [_] | | Manufacturing Quantity (kg) | Importing Quantity (kg) | Processing Quantity (kg) |
| | Amount of increase | | | 0 |
| ğ.i. | Amount of decrease | | | UK |
| <u></u> 1 | Mark (X) this box if you | u attach a continuati | on sheet. | |

| | substance durin | e, specify the number of days you manufactured g the reporting year. Also specify the average s type was operated. (If only one or two opera | number of h | ours per |
|--------------|--|--|-------------|----------------------|
| (<u>CBI</u> | • | | Days/Year | Average Hours/Day |
| | Process Type #1 | (The process type involving the largest quantity of the listed substance.) | | |
| | | Manufactured | N/A | |
| | | Processed | 150 | 6 |
| | Process Type #2 | (The process type involving the 2nd largest quantity of the listed substance.) | | |
| | | Manufactured | N/A | |
| | | Processed | N/A | |
| - | Process Type #3 | (The process type involving the 3rd largest quantity of the listed substance.) | | |
| | | Manufactured | _N/A | |
| | | Processed | N/A | |
| 2.10 CBI | substance that chemical. Maximum daily in | | | a bulk |
| | Average monthly | inventory | | kg |
| / | | | | |
| <u> </u> | Mark (X) this bo | ox if you attach a continuation sheet. | | |

2.09 For the three largest volume manufacturing or processing process types involving the

| <u>CBI</u> | means the sour | ured, imported, or processed. The sou eans the source from which the byprodu ntroduced into the product (e.g., carr tc.). | | s, or impurities | impurities are made or | | |
|------------|--|--|--|---|---|--|--|
| _ | CAS No. | Chemical Name | Byproduct, Coproduct or Impurity | Concentration (%) (specify ± % precision) | Source of By products, Co products, or Impurities | | |
| | | | | | | | |
| | | | | | | | |
| | Use the follow B = Byproduct C = Coproduct I = Impurity | ring codes to designate | byproduct, copro | duct, or impurity | · | | |
| | | | | | | | |
| | | | | | | | |

| | · | b. % of Quantity Manufactured, | c. % of Quantity | d. |
|--------------|---|--|---|---|
| | Product Types ¹ | Imported, or Processed | Used Captively On-Site | Type of End-U |
| | K | 12.2 | 0 | I |
| | L | 87.8 | . 0 | I |
| | | | | |
| - | | *** | | |
| | | | | |
| | | | | |
| | Inhibitor/Stabili | zer/Scavenger/ | 0 = Photographic/Repr and additives | - G-up |
| E:F:G:H:J:K: | Antioxidant Analytical reagen Chelator/Coagulan Cleanser/Detergen Lubricant/Frictio agent Surfactant/Emulsi Flame retardant Coating/Binder/Ad | t t/Sequestrant t/Degreaser n modifier/Antiwear fier | Q = Fuel and fuel add R = Explosive chemica S = Fragrance/Flavor T = Pollution control U = Functional fluids V = Metal alloy and a W = Rheological modif X = Other (specify) | als and additives chemicals chemicals and additives additives fier |

| [] | Expected Product Types Identify all product types which you expect to manufacturing import, or process using the listed substance at any time after your current corporate fiscal year. For each use, specify the quantity you expect to manufacturing port, or process for each use as a percentage of the total volume of listed substance used during the reporting year. Also list the quantity of listed substanced captively on-site as a percentage of the value listed under column b., and the types of end-users for each product type. (Refer to the instructions for further explanation and an example.) | | | | | |
|----|---|--|---|--|--|--|
| | a. | · b. | c. | d. | | |
| | Product Types ¹ | % of Quantity Manufactured, Imported, or Processed | % of Quantity Used Captively On-Site | Type of End-Users | | |
| | К | 15 | 0 | I | | |
| | L | 85 | 0 | · I | | |
| | | | | | | |
| | <pre>"Use the following cod A = Solvent B = Synthetic reactan C = Catalyst/Initiato Sensitizer D = Inhibitor/Stabili Antioxidant E = Analytical reagen F = Chelator/Coagulan G = Cleanser/Detergen H = Lubricant/Frictio agent I = Surfactant/Emulsi J = Flame retardant K = Coating/Binder/Ad</pre> | at or/Accelerator/ zer/Scavenger/ at ot/Sequestrant ot/Degreaser on modifier/Antiwear fier thesive and additives | L = Moldable/Castabl M = Plasticizer N = Dye/Pigment/Colo O = Photographic/Rep and additives P = Electrodepositio Q = Fuel and fuel ad R = Explosive chemic S = Fragrance/Flavor T = Pollution contro U = Functional fluid V = Metal alloy and W = Rheological modi X = Other (specify) | rant/Ink and additive rographic chemical n/Plating chemicals ditives als and additives chemicals l chemicals s and additives additives additives | | |
| | <pre>Use the following cod I = Industrial CM = Commercial</pre> | CS = Cons | | | | |
| | | rou attach a continua | | | | |

| Product Type¹ Final Product's Physical Form² K B 30 I L B 43 I Use the following codes to designate product types: A = Solvent B = Synthetic reactant C = Catalyst/Initiator/Accelerator/ Sensitizer D = Inhibitor/Stabilizer/Scavenger/ Antioxidant E = Analytical reagent Final Product is Listed Substance in Final Product B = Synthetic reactant L = Moldable/Castable/Rubber and addit M = Plasticizer N = Dye/Pigment/Colorant/Ink and addit on Photographic/Reprographic chemical and additives P = Electrodeposition/Plating chemical Q = Fuel and fuel additives F = Chelator/Coagulant/Sequestrant C = Explosive chemicals and additives R = Explosive chemicals and additives | | a. | b. | c. Average % | đ. |
|--|-----------------------|--------------------------------------|-------------------------|-----------------------|-----------------------------------|
| L B 43 I **Use the following codes to designate product types: A = Solvent | - | roduct Type ¹ | | | Type of End-Users ³ |
| **Juse the following codes to designate product types: A = Solvent | | К | В | 30 | I |
| A = Solvent B = Synthetic reactant C = Catalyst/Initiator/Accelerator/ Sensitizer D = Inhibitor/Stabilizer/Scavenger/ Antioxidant E = Analytical reagent C = Cleanser/Detergent/Degreaser H = Lubricant/Friction modifier/Antiwear I = Surfactant/Emulsifier J = Flame retardant K = Coating/Binder/Adhesive and additives X = Gas B = Liquid C = Aqueous solution F = Cheloving codes to designate the final product's physical form: A = Gas B = Liquid C = Aqueous solution F = Other (specify) L = Moldable/Castable/Rubber and additives N = Plasticizer N = Dye/Pigment/Colorant/Ink and additives A = Explosive chemicals A = Explosive chemicals and additives F = Fragrance/Flavor chemicals S = Fragrance/Flavor chemicals U = Functional fluids and additives U = Functional fluids and additives V = Metal alloy and additives V = Metal alloy and additives V = Rheological modifier K = Coating/Binder/Adhesive and additives X = Other (specify) 2 Use the following codes to designate the final product's physical form: A = Gas F 2 = Crystalline solid C = Aqueous solution F 4 = Other solid C = Aqueous solution F 4 = Other (specify) F 1 = Powder 3 Use the following codes to designate the type of end-users: I = Industrial C = Consumer | | L. | B | 43 | I |
| A = Solvent B = Synthetic reactant C = Catalyst/Initiator/Accelerator/ Sensitizer D = Inhibitor/Stabilizer/Scavenger/ Antioxidant E = Analytical reagent C = Cleanser/Detergent/Degreaser H = Lubricant/Friction modifier/Antiwear I = Surfactant/Emulsifier J = Flame retardant K = Coating/Binder/Adhesive and additives X = Gas B = Liquid C = Aqueous solution D = Paste C = Aqueous codes to designate the following codes to designate the type of end-users: I = Industrial L = Moldable/Castable/Rubber and additive M = Plasticizer N = Dye/Pigment/Colorant/Ink and additives O = Photographic/Reprographic chemical additives O = Photographic/Reprographic chemical and additives P = Electrodeposition/Plating chemical O = Fuel and fuel additives S = Fragrance/Flavor chemicals and additives S = Fragrance/Flavor chemicals U = Functional fluids and additives U = Functional fluids and additives U = Functional fluids and additives U = Rheological modifier V = Metal alloy and additives U = Rheological modifier S = Consumer 2 Use the following codes to designate the final product's physical form: A = Gas F 2 = Crystalline solid F 3 = Granules C = Aqueous solution F 4 = Other solid D = Paste G = Gel E = Slurry H = Other (specify) F 1 = Powder 3 Use the following codes to designate the type of end-users: I = Industrial C S = Consumer | | | - | | |
| A = Solvent B = Synthetic reactant C = Catalyst/Initiator/Accelerator/ Sensitizer D = Inhibitor/Stabilizer/Scavenger/ Antioxidant E = Analytical reagent C = Cleanser/Detergent/Degreaser C = Cleanser/Detergent/Degreaser C = Cleanser/Friction modifier/Antiwear C = Surfactant/Emulsifier C = Coating/Binder/Adhesive and additives C = Catalystion C = Aqueous solution C = Aqueous solution C = Aqueous C = Aqueous C = Cleanser C = Cleanser C = Cleanser C = Coating/Binder/Adhesive and additives C = Cleanser C = Coating/Binder/Adhesive and additives C = Cating/Binder/Adhesive and additives C = Aqueous solution C = Aqueous solution C = Aqueous C = Aqueous C = Consumer L = Moldable/Castable/Rubber and additives N = Dye/Pigment/Colorant/Ink and additives n = Dye/Pigment/Colorant/Ink and additives N = Dye/Pigment/Colorant/Ink and additives N = Electrodeposition/Plating chemical n and additives N = Electrodeposition/Plating chemical N = Fuel and fuel additives S = Fragrance/Flavor chemicals N = Explosive chemicals and additives N = Fuel and fuel additives N = Explosive chemical N = Pollution control chemicals U = Functional fluids and additives V = Metal alloy and additives V = Metal alloy and additives N = Other (specify) 2 Use the following codes to designate the final product's physical form: A = Gas F2 = Crystalline solid C = Aqueous solution F4 = Other solid D = Paste G = Gel E = Slurry H = Other (specify) 3 Use the following codes to designate the type of end-users: I = Industrial C = Consumer | _ | | | | |
| A = Solvent B = Synthetic reactant C = Catalyst/Initiator/Accelerator/ Sensitizer D = Inhibitor/Stabilizer/Scavenger/ Antioxidant E = Analytical reagent C = Cleanser/Detergent/Degreaser H = Lubricant/Friction modifier/Antiwear I = Surfactant/Emulsifier J = Flame retardant K = Coating/Binder/Adhesive and additives A = Gas B = Liquid C = Aqueous solution F = Cheloving codes to designate the final product's physical form: A = Gas B = Liquid C = Aqueous solution F = Other (specify) B = Moldable/Castable/Rubber and additives N = Plasticizer N = Dye/Pigment/Colorant/Ink and additives A = Moldable/Castable/Rubber and additives N = Dye/Pigment/Colorant/Ink and additives A = Explosive chemicals and additives S = Fragrance/Flavor chemicals S = Fragrance/Flavor chemicals U = Functional fluids and additives U = Functional fluids and additives V = Metal alloy and additives V = Metal alloy and additives V = Rheological modifier K = Coating/Binder/Adhesive and additives X = Other (specify) 2 Use the following codes to designate the final product's physical form: A = Gas F 2 = Crystalline solid C = Aqueous solution F 4 = Other solid C = Aqueous solution F 4 = Other (specify) F 1 = Powder 3 Use the following codes to designate the type of end-users: I = Industrial C = Consumer | 1 lie | the following o | ondes to designate pro- | duet types | |
| B = Synthetic reactant C = Catalyst/Initiator/Accelerator/ Sensitizer D = Inhibitor/Stabilizer/Scavenger/ Antioxidant E = Analytical reagent G = Cleanser/Detergent/Degreaser H = Lubricant/Friction modifier/Antiwear I = Surfactant/Emulsifier J = Flame retardant K = Coating/Binder/Adhesive and additives X = Cas B = Liquid B = Cyphotographic/Reprographic chemical and additives X = Chelator/Coagulant/Sequestrant C = Cleanser/Detergent/Degreaser C = Cleanser/Degreaser C = Cleanser/Detergent/Degreaser C = Consumer M = Plasticizer N = Dye/Pigment/Colorant/Ink and additives and additives C = Fragrance/Flavor chemicals C = Flavor chemicals C = Follution control chemicals U = Functional fluids and additives U = Functional fluids and a | | | odes to designate proc | | /Rubber and addi |
| C = Catalyst/Initiator/Accelerator/ Sensitizer D = Inhibitor/Stabilizer/Scavenger/ Antioxidant E = Analytical reagent G = Cleanser/Detergent/Degreaser H = Lubricant/Friction modifier/Antiwear I = Surfactant/Emulsifier J = Flame retardant K = Coating/Binder/Adhesive and additives X = Gas B = Liquid B = Liquid B = Liquid C = Aqueous solution D = Paste E = Slurry F = Coating/Sinate the following codes to designate the type of end-users: I = Industrial C = Clanser/Ink and additives A = Dept/Pigment/Colorant/Ink and additives A = Dept/Pigment/Colorant/Ink and additives A = Dept/Pigment/Colorant/Ink and additives A = Electrodeposition/Plating chemical and additives P = Electrodeposition/Plating chemical and additives P = Electrodeposition/Plating chemical A = Explosive chemicals and additives S = Fragrance/Flavor chemicals T = Pollution control chemicals U = Functional fluids and additives V = Metal alloy and additives V = Metal alloy and additives V = Rheological modifier K = Coating/Binder/Adhesive and additives X = Other (specify) P = Crystalline solid F = Crystalline solid F = Other solid C = Aqueous solution F = Other (specify) F = Powder P = Electrodeposition/Plating chemical And additives P = Electrodeposition/Plating chemical Antion/Plating chemical Anti | | | ant | | Aunuel and addit |
| Sensitizer D = Inhibitor/Stabilizer/Scavenger/ Antioxidant E = Analytical reagent F = Chelator/Coagulant/Sequestrant G = Cleanser/Detergent/Degreaser H = Lubricant/Friction modifier/Antiwear J = Flame retardant K = Coating/Binder/Adhesive and additives A = Gas B = Liquid B = Liquid C = Aqueous solution D = Paste E = Slurry P = Delotographic/Reprographic chemical and additives A = Gas F = Cleanser/Detergent/Degreaser C = Pelectrodeposition/Plating chemical A = Gas F = Explosive chemicals and additives F = Explosive chemicals and additives F = Explosive chemicals and additives F = Fragrance/Flavor chemicals U = Functional fluids and additives V = Metal alloy and additives V = Rheological modifier K = Coating/Binder/Adhesive and additives X = Other (specify) 2 Use the following codes to designate the final product's physical form: A = Gas F = Crystalline solid B = Liquid F = Granules C = Aqueous solution F = Other solid D = Paste F = Other (specify) F = Powder 3 Use the following codes to designate the type of end-users: I = Industrial C = Consumer | | | | | ant/Ink and addit |
| D = Inhibitor/Stabilizer/Scavenger/ Antioxidant E = Analytical reagent F = Chelator/Coagulant/Sequestrant G = Cleanser/Detergent/Degreaser H = Lubricant/Friction modifier/Antiwear I = Surfactant/Emulsifier J = Flame retardant K = Coating/Binder/Adhesive and additives X = Crystalline solid B = Liquid C = Aqueous solution D = Paste E = Slurry F1 = Powder Antioxidant P = Electrodeposition/Plating chemicals Q = Fuel and fuel additives R = Explosive chemicals and additives S = Fragrance/Flavor chemicals T = Pollution control chemicals U = Functional fluids and additives V = Metal alloy and additives V = Rheological modifier V = Rheological modifier V = Rheological modifier V = Crystalline solid D = Crystalline solid D = Crystalline solid D = Paste D = Gel D = Gel D = Gel D = Crystalline solid D = Paste C = Gel D = Crystalline solid C = Aqueous solution D = Paste C = Gel D = Crystalline solid D = Paste C = Gel D = Crystalline solid D = Paste C = Gel D = Crystalline solid D = Paste C = Gel D = Crystalline solid D = Paste C = Gel D = Crystalline solid C = Gel D = Crystalline solid C = Aqueous solution C = Gel D = Crystalline solid C = Coher (specify) F1 = Powder 3 Use the following codes to designate the type of end-users: I = Industrial C = Consumer | | | | | |
| Antioxidant E = Analytical reagent F = Chelator/Coagulant/Sequestrant G = Cleanser/Detergent/Degreaser H = Lubricant/Friction modifier/Antiwear I = Surfactant/Emulsifier J = Flame retardant K = Coating/Binder/Adhesive and additives X = Gas B = Liquid C = Aqueous solution D = Paste G = Gel E = Slurry F1 = Powder P = Electrodeposition/Plating chemical Q = Fuel and fuel additives R = Explosive chemicals and additives S = Fragrance/Flavor chemicals S = Fragrance/Flavor chemicals D = Functional fluids and additives V = Metal alloy and additives V = Rheological modifier K = Coating/Binder/Adhesive and additives X = Other (specify) 2 Use the following codes to designate the final product's physical form: A = Gas F2 = Crystalline solid F3 = Granules C = Aqueous solution F4 = Other solid D = Paste G = Gel E = Slurry H = Other (specify) F1 = Powder 3 Use the following codes to designate the type of end-users: I = Industrial CS = Consumer | D: | Inhibitor/Stabi | lizer/Scavenger/ | | -8p |
| E = Analytical reagent F = Chelator/Coagulant/Sequestrant G = Cleanser/Detergent/Degreaser H = Lubricant/Friction modifier/Antiwear agent U = Functional fluids and additives U = Functional fluids and additives U = Functional fluids and additives U = Metal alloy and additives U = Rheological modifier E = Coating/Binder/Adhesive and additives U = Rheological modifier E = Coating/Binder/Adhesive and additives E = Coating/Binder/Adhesive and additives E = Coating/Binder/Adhesive and additives E = Crystalline solid E = Crystalline solid E = Crystalline solid E = Slury F = Other (specify) F = Powder 3 Use the following codes to designate the type of end-users: I = Industrial C = Consumer | | | | | /Plating chemical |
| F = Chelator/Coagulant/Sequestrant G = Cleanser/Detergent/Degreaser S = Fragrance/Flavor chemicals H = Lubricant/Friction modifier/Antiwear agent U = Functional fluids and additives V = Metal alloy and additives V = Rheological modifier K = Coating/Binder/Adhesive and additives X = Other (specify) 2 Use the following codes to designate the final product's physical form: A = Gas F2 = Crystalline solid B = Liquid F3 = Granules C = Aqueous solution D = Paste G = Gel E = Slurry H = Other (specify) F1 = Powder 3 Use the following codes to designate the type of end-users: I = Industrial CS = Consumer | E = | Analytical reag | ent | | |
| G = Cleanser/Detergent/Degreaser S = Fragrance/Flavor chemicals H = Lubricant/Friction modifier/Antiwear T = Pollution control chemicals agent U = Functional fluids and additives I = Surfactant/Emulsifier V = Metal alloy and additives J = Flame retardant W = Rheological modifier K = Coating/Binder/Adhesive and additives X = Other (specify) 2 Use the following codes to designate the final product's physical form: A = Gas F2 = Crystalline solid B = Liquid F3 = Granules C = Aqueous solution F4 = Other solid D = Paste G = Gel E = Slurry H = Other (specify) F1 = Powder 3 Use the following codes to designate the type of end-users: I = Industrial CS = Consumer | | | | | |
| H = Lubricant/Friction modifier/Antiwear T = Pollution control chemicals agent U = Functional fluids and additives I = Surfactant/Emulsifier V = Metal alloy and additives J = Flame retardant W = Rheological modifier K = Coating/Binder/Adhesive and additives X = Other (specify) 2 Use the following codes to designate the final product's physical form: A = Gas F2 = Crystalline solid B = Liquid F3 = Granules C = Aqueous solution F4 = Other solid D = Paste G = Gel E = Slurry H = Other (specify) F1 = Powder 3 Use the following codes to designate the type of end-users: I = Industrial CS = Consumer | ^ | | | | |
| agent I = Surfactant/Emulsifier J = Flame retardant K = Coating/Binder/Adhesive and additives V = Rheological modifier V = Retal alloy and additives X = Other (specify) F1 = Crystalline solid F2 = Crystalline solid F3 = Granules C = Aqueous solution F4 = Other solid D = Paste G = Gel H = Other (specify) F1 = Powder 3 Use the following codes to designate the type of end-users: I = Industrial CS = Consumer | | | | | |
| I = Surfactant/Emulsifier | | | | | |
| J = Flame retardant K = Coating/Binder/Adhesive and additives X = Other (specify) Use the following codes to designate the final product's physical form: A = Gas F2 = Crystalline solid B = Liquid F3 = Granules C = Aqueous solution F4 = Other solid D = Paste G = Gel E = Slurry H = Other (specify) F1 = Powder Use the following codes to designate the type of end-users: I = Industrial CS = Consumer | I - | Surfactant/Emul | sifier | | |
| <pre>K = Coating/Binder/Adhesive and additives X = Other (specify) 2 Use the following codes to designate the final product's physical form: A = Gas</pre> | | | | | |
| A = Gas B = Liquid C = Aqueous solution D = Paste E = Slurry F1 = Powder F2 = Crystalline solid F3 = Granules C = Aqueous solution F4 = Other solid G = Gel H = Other (specify) F1 = Powder CS = Consumer | | | | X = Other (specify) | |
| B = Liquid F3 = Granules C = Aqueous solution F4 = Other solid D = Paste G = Gel E = Slurry H = Other (specify) F1 = Powder 3 Use the following codes to designate the type of end-users: I = Industrial CS = Consumer | ² Use | | | | al form: |
| C = Aqueous solution D = Paste G = Gel E = Slurry H = Other (specify) F1 = Powder 3 Use the following codes to designate the type of end-users: I = Industrial CS = Consumer | | | | | |
| D = Paste G = Gel E = Slurry H = Other (specify) F1 = Powder 3 Use the following codes to designate the type of end-users: I = Industrial CS = Consumer | | | | | |
| E = Slurry H = Other (specify) F1 = Powder 3 Use the following codes to designate the type of end-users: I = Industrial CS = Consumer | B = | Aqueous solution | | r solid | |
| F1 = Powder **Use the following codes to designate the type of end-users: I = Industrial | B = C = | | | | |
| ³ Use the following codes to designate the type of end-users: I = Industrial | B = C = D = | Paste | H = Uthe | r (specify) | |
| I = Industrial CS = Consumer | B = C = D = E = | Paste Slurry | | | |
| | B = C = D = F1 | Paste Slurry = Powder | ndon to donienoto the | turns of and uncourt. | |
| on = commercial n = other (specify) | B = C = D = F1 3 Use | Paste Slurry Powder the following co | | | |
| | B = C = D = F1 3 Use | Paste Slurry Powder the following co | CS = Cons | umer | · |

| 2.15 CBI | Circ list | le all applicable modes of transportation used to delived substance to off-site customers. | er bulk shipments of | the 🔻 | | | | | |
|-------------|--------------|--|---|-------|--|--|--|--|--|
| [_] | Truc | k | | (1 | | | | | |
| | Rail | car | | 2 | | | | | |
| | Barg | e, Vessel | • | 3 | | | | | |
| | Pipe | Pipeline 4 | | | | | | | |
| | Plan | B | • | 5 | | | | | |
| | Othe | r (specify) | • | 6 | | | | | |
| 2.16 CBI | or p | omer Use Estimate the quantity of the listed substant repared by your customers during the reporting year for and use listed (i-iv). | | omers | | | | | |
| [_] | Cate | Category of End Use | | | | | | | |
| | i. | Industrial Products | | | | | | | |
| | | Chemical or mixture | 16,000 | kg/yr | | | | | |
| | | Article | N/A | kg/yr | | | | | |
| | ii. | Commercial Products | | | | | | | |
| | | Chemical or mixture | | | | | | | |
| | | Article | N/A | kg/yr | | | | | |
| | iii. | Consumer Products | | | | | | | |
| | | Chemical or mixture | n/A | kg/yr | | | | | |
| | • | Article | _N/A | kg/yr | | | | | |
| | iv. | Other | | | | | | | |
| | 14. | | | | | | | | |
| | 14. | Distribution (excluding export) | -N/A | kg/yr | | | | | |
| | 14. | | | | | | | | |
| | 14. | Distribution (excluding export) | N/A | kg/yr | | | | | |

| <u>CBI</u> | Specify the quantity purchased and the average price for each major source of supply listed. Product tra The average price is the market value of the product substance. Source of Supply The listed substance was manufactured on-site. | des are treated a | s purchases. for the listed Average Price |
|------------|--|-------------------|---|
| | | | |
| • | The listed substance was manufactured on-site. | | (\$/kg) |
| | | NA | NA |
| | The listed substance was transferred from a different company site. | NA . | NA NA |
| • | The listed substance was purchased directly from a manufacturer or importer. | 130,000 | 1.98 |
| | The listed substance was purchased from a distributor or repackager. | NA | NA |
| | The listed substance was purchased from a mixture producer. | NA | NA NA |
| CBI 3 () F | Circle all applicable modes of transportation used to your facility. Fruck | | |

| 3.03 a. | Circle all applicable containers used to transport the listed subs facility. | tance to | your |
|---------|--|---------------------------------------|-----------|
| [_] | Bags | • • • • • • • • | • • • • • |
| | Boxes | • • • • • • • • • • • • • • • • • • • | |
| | Free standing tank cylinders | | |
| | Tank rail cars | | |
| • | Hopper cars | | |
| ŧ | Tank trucks | | |
| | Hopper trucks | | _ |
| | Drums | | |
| | Pipeline | | |
| | Other (specify) | | |
| b. | If the listed substance is transported in pressurized tank cylinder cars, or tank trucks, state the pressure of the tanks. | | |
| | Tank cylinders | N/A | mmHg |
| | Tank rail cars | | mmHg |
| | Tank trucks | | |
| , , | | N/H | |
| • | | | |
| ř | | | |
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| | (Y) this hav if you stack a read- | | |

| o BI a | If you obtain the listed substance in the form of a mixture, list the trade name(s) of the mixture, the name of its supplier(s) or manufacturer(s), an estimate of the average percent composition by weight of the listed substance in the mixture, and t amount of mixture processed during the reporting year. | | | | | |
|------------|---|-----------------------------|---|--------------------------------|--|--|
| _ ' | Trade Name | Supplier or Manufacturer | Average % Composition by Weight (specify ± % precision) | Amount Processed (kg/yr) | | |
| | | | | | | |
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| 3.05 CBI | reporting year in the fo | State the quantity of the listed substance used as a raw material during the reporting year in the form of a class I chemical, class II chemical, or polymer, and the percent composition, by weight, of the listed substance. | | | | |
|-------------|--------------------------|--|--|--|--|--|
| , | | Quantity Used (kg/yr) | <pre>% Composition by Weight of Listed Sub- stance in Raw Material (specify ± % precision)</pre> | | | |
| | Class I chemical | 142,083 | 100 | | | |
| | Class II chemical | NA | | | | |
| ٠. | Polymer | NA | | | | |
| | | | | | | |
| | | | | | | |
| | | | | | | |
| | | | | | | |
| | | | | | | |

| | SECT | FION 4 PHYSICAL/CHE | EMICAL PROPERTIES | | | | | |
|-------------|---|--|--|---|--|--|--|--|
| Gene | ral Instructions: | | | | | | | |
| | ou are reporting on a mixt at are inappropriate to mi | | | uestions in Section | | | | |
| notio | questions 4.06-4.15, if yo ce that addresses the info imile in lieu of answering | ormation requested, | you may submit a copy o | | | | | |
| PART | A PHYSICAL/CHEMICAL DATA | A SUMMARY | | | | | | |
| 4.01 CBI | Specify the percent puri substance as it is manuf substance in the final pimport the substance, or | or processed. Measure ufacturing activities, | the purity of the at the time you | | | | | |
| [_] | | Manufacture | Import | Process | | | | |
| | Technical grade #1 | N/A % purity | N/A % purity | | | | | |
| | Technical grade #2 | N/A % purity | N/A % purity | N/A % purity | | | | |
| | Technical grade #3 | N/A % purity | N/A % purity | N/A% purity | | | | |
| | ¹ Major = Greatest quanti | ty of listed substa | nce manufactured, impor | ted or processed. | | | | |
| 4.02 | Submit your most recently substance, and for every an MSDS that you develop version. Indicate whether appropriate response. | formulation contained and an MSDS deve | ning the listed substandoped by a different so | ce. If you possess urce, submit your | | | | |
| | Yes | Yes | | | | | | |
| | No | • | | 2 | | | | |
| | Indicate whether the MSD | S was developed by | your company or by a di | fferent source. | | | | |
| | Your company | ••••• | • | (1 | | | | |
| | Another source | | • | 2 | | | | |
| | | | | | | | | |

 $[\overline{x}]$ Mark (X) this box if you attach a continuation sheet.

| 4.03 | Submit a copy or reasonable facsimile of any hazard information (other than an MSDS) that is provided to your customers/users regarding the listed substance or any formulation containing the listed substance. Indicate whether this information has been submitted by circling the appropriate response. |
|------|---|
| | Yes |
| | No 2 |
| 4.04 | For each activity that uses the listed substance, circle all the applicable number(s) corresponding to each physical state of the listed substance during the activity listed. Physical states for importing and processing activities are determined at |
| CBI | the time you import or begin to process the listed substance. Physical states for manufacturing, storage, disposal and transport activities are determined using the final state of the product. |

| | | Phy | sical State | | |
|-------------|-------|--------|-------------|------------------|-----|
| Activity | Solid | Slurry | Liquid | Liquified Gas | Gas |
| Manufacture | 1 | 2 | 3 | 4 | 5 |
| Import | 1 | 2 | 3 | 4 | 5 |
| Process | 1 | 2 | 3 | 4 | 5 |
| Store | 1 | 2 | 3 | 4 | 5 |
| Dispose | 1 | 2 | 3 | 4 | 5 |
| Transport | 1 | 2 | 3 | 4 | 5 |

| [_] | Mark (X) | this box if | you attach a | continuation | sheet. |
|-----|----------|-------------|--------------|--------------|--------|
| | | | | | |

| 4.05 <u>CBI</u> [_] | following percentage particles importing listed su | Size If the lister activities, indicate ge distribution of the size ≥10 microns in diams and processing activities and processing activities activities and transport and transport activities and transport activities and transport activities and transport activities are activities and activities are activities and activities are activities and activities are activities and activities are activities activities are activities activities are activities activities activities activities are activities | te for each ap ne listed subs neter. Measur vities at the ne physical st | plicable tance by the the phe time you ate and | e physical vactivity nysical st ou import particle | state Do nate and or beging sizes f | the size of include particle n to procord or manufa | and the le sizes for ess the cturing |
|---------------------|--|--|--|--|--|-------------------------------------|---|--|
| | Physical State | N/A) | Manufacture | Import | Process | Store | Dispose | Transport |
| | Dust | <1 micron | | *** | | | | |
| | | 1 to <5 microns | | <u>` </u> | | | | |
| | | 5 to <10 microns | **** | | | | | |
| | Powder | <1 micron | | | | | | *************************************** |
| | | 1 to <5 microns | | *************************************** | | | | |
| | | 5 to <10 microns | | · · · · · · · · · · · · · · · · · · · | | | | |
| | Fiber | <1 micron | | | | 44 | | |
| | | 1 to <5 microns | **** | | | ****** | | |
| | | 5 to <10 microns | | | | | | |
| | Aerosol | <1 micron | ###################################### | | • • • • • • • • • • • • • • • • • • • | | | |
| | | 1 to <5 microns | | | | | | |
| | | 5 to <10 microns | | | | | | |
| | | | | | | | | |
| | | | | | | | | |
| | | | | | | | | |
| | | | | | | | | |
| | Mark (X) | this box if you attac | ch a continuat | tion she | et. | ····· | | |

| A i | RATE CONSTANTS AND TRANSFORMATION PRODUCTS | | |
|-----|---|------------------------|-------|
| Inc | licate the rate constants for the following tr | ansformation processes | s. |
| a. | Photolysis: | | |
| | Absorption spectrum coefficient (peak) | NA (1/M cm) at | nm |
| | Reaction quantum yield, 6 | NA at | nm |
| | Direct photolysis rate constant, k_p , at | NA 1/hr | latit |
| b. | Oxidation constants at 25°C: | | |
| | For 10 ₂ (singlet oxygen), k _{ox} | NA | 1/: |
| | For RO ₂ (peroxy radical), k _{ox} | NA | 1/ |
| c. | Five-day biochemical oxygen demand, BOD ₅ | NA | mg |
| d. | Biotransformation rate constant: | | |
| | For bacterial transformation in water, k_b | NA | 1/ |
| | Specify culture | NA | ··· |
| e. | Hydrolysis rate constants: | | |
| | For base-promoted process, k _B | NA | 1/i |
| | For acid-promoted process, k, | NA | 1/1 |
| | For neutral process, k _N | NA | 1/1 |
| f. | Chemical reduction rate (specify conditions) | NA | |

| | | | | | | | • |
|------------|------|----------|--------|--------------|----------------|--------|---|
| <u>_</u> 1 | Mark | (X) this | box if | you attach a | a continuation | sheet. | |

| PART | B 1 | PARTITION COEFFICIENTS | | | |
|------|------|---|---|------------------------------|---------------------|
| 5.02 | a. | Specify the half-life of t | he listed subs | tance in the followi | ng media. |
| | | <u>Media</u> | | Half-life (speci | fy units) |
| | | Groundwater | NA | | |
| | | Atmosphere | NA | | |
| | | Surface water | NA | | |
| | | Soil | <u>NA</u> | | |
| | b. | Identify the listed substantife greater than 24 hours | | ansformation products | s that have a half- |
| | | CAS No. | Name | Half-life (specify units) | Media |
| | | NA | | | in |
| | | | | | in |
| | | | | _ | in |
| | | | | | in |
| 5.03 | Spe | cify the octanol-water parti | ition coefficia | ent. K NA | at 25°0 |
| | | hod of calculation or determ | | | |
| | | | | | |
| 5.04 | Spe | cify the soil-water partition | on coefficient, | K _d NA | at 25°C |
| | Soi | l type | • | NA | |
| | | ···· | | | |
| 5.05 | | cify the organic carbon-wate fficient, K _{oc} | | <u>NA</u> | at 25°C |
| 5.06 | Spec | cify the Henry's Law Constan | it, H | NA | atm-m³/mole |
| | | | | | · |
| | Mark | t (X) this box if you attach | a continuatio | n sheet. | |
| | | | | | |

| Bioconcentration Factor | <u>Species</u> | <u>Test¹</u> |
|--|----------------------------|--|
| NA | | the second secon |
| | | |
| | | |
| ¹ Use the following codes to de | esignate the type of test: | • |
| F = Flowthrough S = Static | | |
| | | |
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| | | |

| | | 0 744 033 77 | Total Sales |
|----------|--|---|---|
| | Market | Quantity Sold or Transferred (kg/yr) | Value (\$/yr) |
| | Retail sales | | |
| | Distribution Wholesalers | | |
| | Distribution Retailers | / | |
| | Intra-company transfer | <u> </u> | |
| | Repackagers | • | |
| | Mixture producers | | |
| | Article producers | | |
| | Other chemical manufacturers or processors | | |
| | Exporters | | |
| / | Other (specify) | | |
| .05 | Substitutes List all known co | mmercially feasible substitute | es that you know exist |
| BI | for the listed substance and sta feasible substitute is one which in your current operation, and w performance in its end uses. | te the cost of each substitute is economically and technolog hich results in a final produc | e. A commercially gically feasible to use |
| :BI] | feasible substitute is one which in your current operation, and w | is economically and technology thich results in a final produc | e. A commercially gically feasible to use |
| BI | feasible substitute is one which in your current operation, and w performance in its end uses. | is economically and technology thich results in a final produc | e. A commercially gically feasible to use to the comparable |
| BI | feasible substitute is one which in your current operation, and w performance in its end uses. Substitute | is economically and technology thich results in a final produc | e. A commercially gically feasible to use to the comparable |
| BI | feasible substitute is one which in your current operation, and w performance in its end uses. Substitute | is economically and technology thich results in a final produc | e. A commercially gically feasible to use to the comparable |
| BI | feasible substitute is one which in your current operation, and w performance in its end uses. Substitute | is economically and technology thich results in a final produc | e. A commercially gically feasible to use to the comparable |
| BI | feasible substitute is one which in your current operation, and w performance in its end uses. Substitute | is economically and technology thich results in a final produc | e. A commercially gically feasible to use to the comparable |
| BI | feasible substitute is one which in your current operation, and w performance in its end uses. Substitute | is economically and technology thich results in a final produc | e. A commercially gically feasible to use to the comparable |

SECTION 7 MANUFACTURING AND PROCESSING INFORMATION

General Instructions:

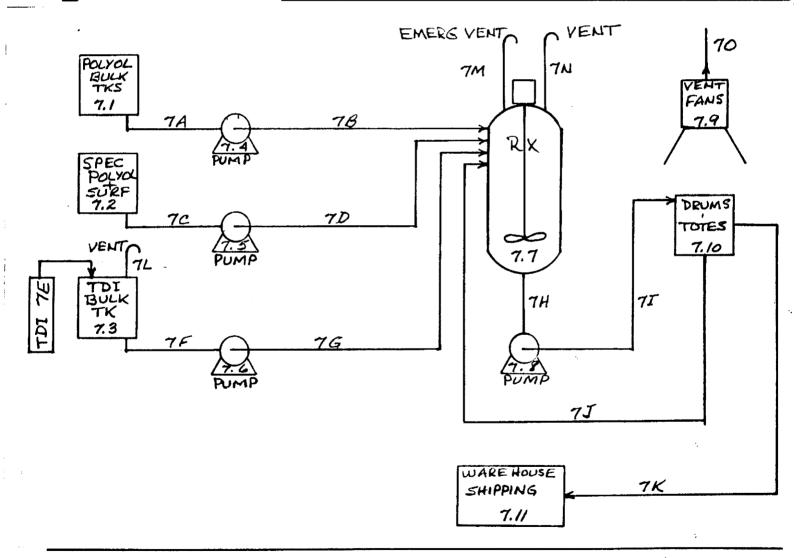
For questions 7.04-7.06, provide a separate response for each process block flow diagram provided in questions 7.01, 7.02, and 7.03. Identify the process type from which the information is extracted.

PART A MANUFACTURING AND PROCESSING PROCESS TYPE DESCRIPTION

7.01 In accordance with the instructions, provide a process block flow diagram showing the major (greatest volume) process type involving the listed substance.

CBI

Process type TDI PREPOLYMER MANUFACTURING PROCESS

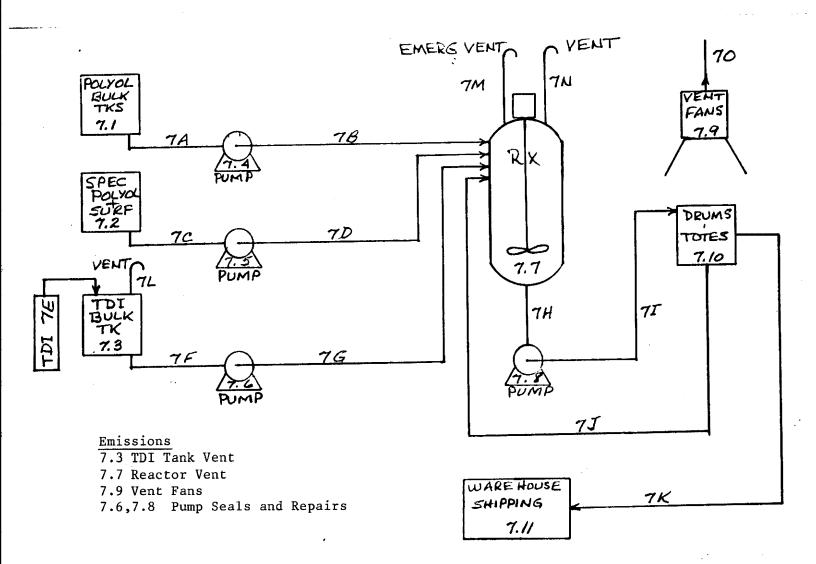


[] Mark (X) this box if you attach a continuation sheet.

7.03 In accordance with the instructions, provide a process block flow diagram showing all process emission streams and emission points that contain the listed substance and which, if combined, would total at least 90 percent of all facility emissions if not treated before emission into the environment. If all such emissions are released from one process type, provide a process block flow diagram using the instructions for question 7.01. If all such emissions are released from more than one process type, provide a process block flow diagram showing each process type as a separate block.

CBI

Process type TDI PREPOLYMER MANUFACTURING PROCESS



[] Mark (X) this box if you attach a continuation sheet.

| 7.04 <u>CBI</u> | process block | typical equipment typ flow diagram(s). If ess type, photocopy t | a process block flow | w diagram is pro | vided for more |
|--------------------|--------------------------|---|--|----------------------------------|-----------------------|
| [_] | Process type | TDI PREPOLY | MER MANUFACTURING PR | OCESS | |
| | Unit Operation ID Number | Typical Equipment Type | Operating Temperature Range (°C) | Operating Pressure Range (mm Hg) | Vessel Composition |
| | 7.1 | STORAGE TK | 40°C | ATMOS. | STEEL |
| | 7.2 | DRUMS | AMBIENT | ATMOS. | STEEL |
| | 7.3 | STORAGE TK | 40°C | ATMOS | STEEL |
| | 7.4 | TRANSFER PMP | 40°C | <8000 | STEEL |
| | 7.5 | TRANSFER PMP | 40°C | <8000 | STEEL |
| | 7.6 | CAN PUMP | 40°C | 2000 | STAINLESS ST |
| | 7.7 | REACTOR | AMB-120°C | 700-1000 | STAINLESS ST |

AMB-120°C

AMB

AMB

AMB

<8000

ATMOS.

ATMOS.

ATMOS.

STEEL

ALUM

STEEL

N/A

7.8

7.9

7.10

7.11

TRANSFER PUMP

RADIAL BLOWERS

ENCLOSED BLDG

DRUM NOZZ & SCALE

|--|

| | | | it separately for each | ore than one process typ process type. | e, photocopy thi |
|------------|--|---|---|--|------------------------|
| <u>CBI</u> | | | | | |
| [_] | Process type . | | TDI PREPOLYER MANUFA | CTURING PROCESS | |
| | Process Stream ID Code | | Process Stream Description | Physical State ¹ | Stream Flow (kg/yr) |
| | 7E, 7F, 7G | TDI | | OL | 140,000 |
| | _7A, 7B | POLYO | I. | <u>or</u> | 135,000 |
| | 7C, 7D | POLYO | L & SURFACTANTS | OL | 50,000 |
| | 7H, 7I, 7K | PREPO | LYMERS | OL | 325,000 |
| | | | | | |
| 4 | 7J | PREPO | LYMER REWORK | OL | 5,000 |
| 2 | 7L, 7M, 7N | TANK | VENTS | GU | < 7 |
| • | 70 | LOCAL | EXHAUST VENT | GU | NK |
| | GC = Gas (cond GU = Gas (unco SO = Solid SY = Sludge or AL = Aqueous l OL = Organic l | lensible ondensibl slurry liquid liquid | at ambient temperature le at ambient temperatu | | |

| CBI | instruction | on and complete it separa s for further explanation | n and an exampl | le.) | keler to the |
|-----------|------------------------|--|--|---------------------------------------|-------------------------------------|
| [_] | | e TDI PREPOI | | RING PROCESS | e. |
| | Process Stream ID Code | b. Known Compounds ¹ | Concen- trations ^{2,3} (% or ppm) | Other Expected Compounds HYDROLYZABLE | Estimated Concentrations (% or ppm) |
| | 7A | TDI | 99.9% AW | CHLORINE | 100 PPM AW |
| | 7 C | SPECIAL POLYOLS SURFACTANT | 0-25% EW 0-1% EW | NA NA | NA |
| | | FLUOROCARBON | 0-5% EW | NA | NA . |
| | <u>7</u> F | POLYETHER POLYOLS | 100% EW | NA | NA |
| - | continued be | elow | | | |
| | | | | | |
| | | | 1 | | |

| 7 | Λ6 | (conti | haus |
|----|----|--------|------|
| 7. | 06 | (conti | nuea |

¹For each additive package introduced into a process stream, specify the compounds that are present in each additive package, and the concentration of each component. Assign an additive package number to each additive package and list this number in column b. (Refer to the instructions for further explanation and an example. Refer to the glossary for the definition of additive package.)

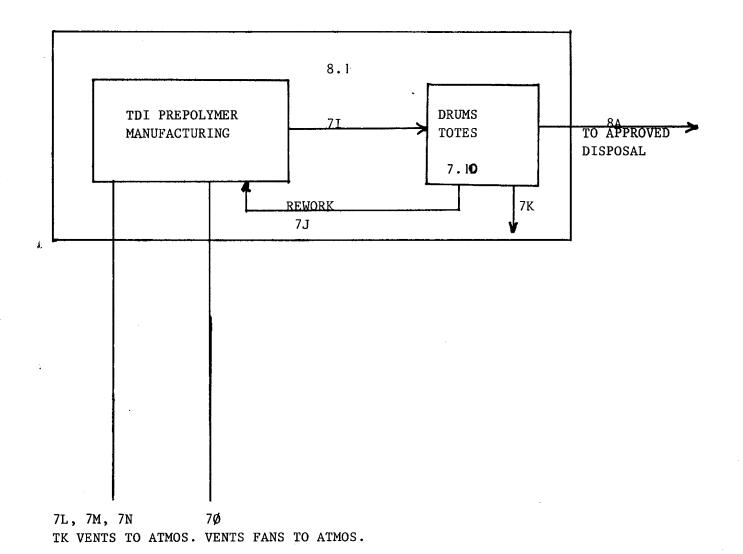
| Additive Package Number | Components of Additive Package | Concentrations (% or ppm) |
|---|--------------------------------------|---------------------------|
| 1 | | |
| | | |
|) | | |
| 2 | | |
| | | • |
| | | |
| 3 | | |
| | | |
| | | |
| 4 | | |
| | | |
| 5 | | |
| | | |
| | | |
| se the following codes | s to designate how the concentration | on was determined: |
| Analytical resultEngineering judgeme | ent/calculation | |
| se the following codes | s to designate how the concentration | on was measured: |
| <pre>= Volume = Weight</pre> | | |
| | | |

PART A RESIDUAL TREATMENT PROCESS DESCRIPTION

3.01 In accordance with the instructions, provide a residual treatment block flow diagram which describes the treatment process used for residuals identified in question 7.01.

CBI

Process type TDI PREPOLYMER MANUFACTURING PROCESS



[] Mark (X) this box if you attach a continuation sheet.

| <u>CBI</u> | Characterize each process stream identified in your residual treatment block flow diagram(s). If a residual treatment block flow diagram is provided for more than process type, photocopy this question and complete it separately for each process type. (Refer to the instructions for further explanation and an example.) | | | | | | | |
|------------|--|---------------------------|--|----------------------------------|--------------------------------------|-------------|--------------------------------|--|
| | • | | | PROPOLYMER MANUFACTURING PROCESS | | | | |
| | Stream ID Code | b. Type of HazardousWaste | c. Physical State of Residual ² | d. Known Compounds ³ | Concentra- tions (% or ppm) 4,5,6 | Exp | f. ther pected pounds | g. Estimated Concen- trations (% or ppm) |
| | 8A | T | OL | TDI | 10-50 % (E) | (W) | NA | NA |
| | | | OL | TDI PROPOLYMER | 60-100% (E) | (W) | NA | NA |
| š. | 71.7 7M | Т | GU | AIR | 99.9+ % (E) | (<u>W)</u> | NA | NA |
| | 7M 7N | | GU | TDI | 25 PPM (E) (| (W) | NA | NA NA |
| • | 70 | T | GU | AIR | 99.9+% (E) (| (W) | NA | NA |
| | | | GU | TDI | 0.05 PPM (E) | (W)_ | NA | <u>NA</u> |
| | | | | | | | , | |
| • | | | | - | | | | |
| | | | | | | | | |
| 05 c | ontinue | d below | | | | | | · |

8.05 (continued) 1 Use the following codes to designate the type of hazardous waste: I = Ignitable C = Corrosive R = Reactive E = EP toxicT = ToxicH = Acutely hazardous ²Use the following codes to designate the physical state of the residual: GC = Gas (condensible at ambient temperature and pressure) GU = Gas (uncondensible at ambient temperature and pressure) SO = Solid SY = Sludge or slurry AL = Aqueous liquid OL = Organic liquid IL = Immiscible liquid (specify phases, e.g., 90% water, 10% toluene) 8.05 continued below

[_] Mark (X) this box if you attach a continuation sheet.

| R . | 05 | (continued) | ì |
|------------|----|-------------|---|
| | | (| , |

³For each additive package introduced into a process stream, specify the compounds that are present in each additive package, and the concentration of each component. Assign an additive package number to each additive package and list this number in column d. (Refer to the instructions for further explanation and an example. Refer to the glossary for the definition of additive package.)

| Additive Package Number | Components of Additive Package | (% or ppm) |
|--|--------------------------------------|--------------------|
| 1 | | |
| | | |
| (N/A) | | |
| | | |
| 2 | | |
| | | |
| | | |
| .: 3 | | |
| | | |
| ६ १९ | | |
| , | | |
| 4 | | |
| · · | | |
| | | |
| 5 | | |
| | | |
| | | |
| | | |
| ⁴ Use the following code | s to designate how the concentration | on was determined: |
| A = Analytical result E = Engineering judgem | ent/calculation | |
| continued below | | · |
| Mark (X) this box if yo | ou attach a continuation sheet. | |
| | 56 | |

| 8.05 (| cont | inued | I) |
|--------|------|-------|----|
|--------|------|-------|----|

⁵Use the following codes to designate how the concentration was measured:

V = Volume

W = Weight

⁶Specify the analytical test methods used and their detection limits in the table below. Assign a code to each test method used and list those codes in column e.

| N/A Code | Method | Detection Limit (± ug/l) |
|-------------|------------|--------------------------|
| 1 | | |
| | | |
| 3 | | |
| 4 | | |
| _5 | | |
| _6 | | |

[_] Mark (X) this box if you attach a continuation sheet.

| _] | Process | type | ···TDI | PREPOLYMER | MANUFACTU | RING PROCE | | |
|----|----------------------|--------------------|-----------------------------|-----------------------|--|------------|------------------------|--------------------------------|
| | a. Stream | b. Waste | C. Management | Residual | | gement | f. Costs for Off-Site | g. Changes in Management |
| | ID Code | Description Code 1 | Method Code ² | Quantities (kg/yr) | | Off-Site | Management (per kg) | Methods |
| 8 | BA | B69 | 7S | 900 . | 0 | 100 % | \$1.02 | 1 <u>I (4/89)</u> |
| | | | <u>1</u> A | 900 | 100 % | 0 | NA | NONE |
| | | | | | | | | ************* |
| 7 | 7L } | B91 | <u>M5A</u> | <7 | 100 % | 0 | <u>NA</u> | NONE |
| | 7M 7N | | | | | | | |
| | • | | | | | | | |
| | 7Ø | B91 | M5A | < 1 | 100 % | 0 | NA | NONE |
| | | | | | <u></u> | | | |
| | | | | | | | | |
| • | | | | | ************************************** | | | |
| | | | | | | | | |
| | | | | | | | | |
| | ¹ Use the | codes provi | ded in Exhi | bit 8-1 to d | esignate | the waste | descriptions | 5 |

| <u>:BI</u> | your process l | Comb Ch | Combustion Chamber Temperature (°C) | | tion of erature nitor | Reside In Com | ence Time abustion (seconds) |
|---------------------------|--|--------------------------|--|--|--------------------------------|--|------------------------------------|
| | Incinerator | Primary | Secondary | Primary | Secondary | Primary | Secondary |
| | 1 | | | | | | |
| | 2 | | | | | | |
| | 3 | | | | | | |
| | by circ | ling the app | of Solid Was propriate res | ponse. | | | |
| | Yes | | | | | | |
| | No | ••••• | • • • • • • • • • • • • | • | | | |
| CBI | Complete the are used on-s treatment blo | ite to burn | gram(s). | s identified | st (by capaci d in your pro | Туре | s of |
| B.23 <u>CBI</u> [_] | are used on-s | ite to burn | the residual gram(s). Air P Contro | three larges s identified of the collution largest lar | | Type Emissio Avai | • |
| <u>CBI</u> | Incinerator | ite to burn | Air P Contro | ollution | | Type Emissio | s of |
| <u>CBI</u> | Incinerator 2 | ite to burn | the residual gram(s). Air P Contro | ollution | | Type Emissio Avai | s of |
| CBI | Incinerator 2 Indicate by circ | ite to burn ck flow diag | Air P Contro N/A N/A N/A N/A Spropriate res | ollution l Device te survey h | as been submi | Type Emissio Avai N/A N/A N/A tted in lieu | s of ons Data lable |
| CBI | Incinerator 1 2 Indicate by circ | ite to burn ck flow diag | Air P Contro N/A N/A N/A N/A Propriate res | ollution l Device te survey h | as been submi | Type Emissio Avai N/A N/A N/A tted in lieu | s of ons Data lable of response |
| CBI | Incinerator 1 2 3 Indicate by circ | ite to burn ck flow diag | Air P Contro N/A N/A N/A N/A Propriate res | ollution l Device te survey h sponse. | as been submi | Type Emissio Avai N/A N/A N/A tted in lieu | s of ons Data lable |
| CBI | Incinerator 1 2 3 Indicate by circ Yes No | e if Office cling the ap | Air P Contro N/A N/A N/A N/A Propriate res | ollution l Device te survey h sponse. | as been submi | Type Emissio Avai N/A N/A N/A tted in lieu | s of ons Data lable |

Attachments for 1.04b:

1. Notification letter to customers listing trade name products.



CERTIFIED MAIL
RETURN RECEIPT REQUESTED

April 5, 1989

The Environmental Protection Agency promulgated the "Comprehensive Assessment Information Rule(CAIR)," 40 CFR Part 704 which appeared in the Federal Register(53 FR 51698) on December 22, 1988. This rule has notification, reporting and record-keeping requirements for certain manufacturers, importers and processors of toluene diisocyanate(TDI) and several other substances.

As a customer of IPI, you may have obligations under CAIR when using our TDI-containing trade name products. IPI will be reporting as a processor of 80/20 2,4-/2,6-toluene diisocyanate(CAS 26471-62-5).

The following trade name products made by IPI contain 80/20 TDI(CAS 26471-62-5) and must be reported under CAIR unless certain exemptions apply:

| Isofoam® | | Isofoam® | | Castomer tm | |
|----------|----------|----------|----------|------------------------|---------|
| Isofoam® | F-0071A | Isofoam® | | Castomer tm | |
| Isofoam® | | Isofoam® | | Castomer tm | |
| Isofoam® | | Isofoam® | SR-0832A | Castomer tm | E-0950A |
| Isofoam® | | Isofoam® | | Castomer tm | E-1114A |
| Isofoam® | SR-0486A | Isofoam® | SR-0968A | Castomer tm | E-1154A |

The CAIR forms, instructions, regulations and sample question/answer documents are available from:

TSCA Assistance Office (TS-799) Office of Toxic Substances Environmental Protection Agency 401 M Street, SW. Washington, DC 20460

(800) 658-8823 (202) 554-1404



For processors of the trade name products listed the following questions must be answered as described in the rule at 40 CFR 704.225(page 51722) of the Federal Register:

Questions numbered 1, 2.04 thru 2.09, 2.11 thru 2.16, 3 all, 4.01 thru 4.05, 5 all, 6.05, 7.01, 7.03 thru 7.06, 8.01, 8.05, 8.06, 8.23, 9.01 thru 9.15, 9.19, 9.20, 9.22, 10.01, 10.02, 10.05, 10.08 thru 10.16 and 10.23.

Unless certain exemptions are met, the CAIR reporting form must be submitted by certified mail to:

TSCA Document Processing Center (TS-790)
Office of Toxic Substances
U.S. Environmental Protection Agency
Room L-100
401 M Street, SW.
Washington, DC 20460
ATTENTION: CAIR Reporting

The present deadline for reporting is July 6, 1989. Requests for reasonable extensions described in section 704.215(b) must be in writing and sent to the above address attention of CAIR Reporting Extension.

This notification letter is one of several obligations IPI has under CAIR. Attached is the SPI EPA Alert which summarizes CAIR. We urge you to obtain any necessary documents to determine your obligations. Penalties can be substantial and accrue daily.

Sincerely,

IPI, A Division of PMC, INC.

russwell

Gary G. Maxwell

Environmental Coordinator Technical Support Services

ggm/jrb

Enclosure

CAIR_IPI

EPA



ALERT

THE SOCIETY OF THE PLASTICS INDUSTRY, INC. 1275 K ST., N. W. WASHINGTON D.C. 20005 (202)371-5200 FAX (202)371-1022

February 3,1989

TSCA Compliance

"Comprehensive Assessment Information Rule (CAIR)"

ATTENTION: PROCESSORS OF TDI-CONTAINING MATERIALS

AFFECTED FACILITIES:

Any company (unless exempted as noted below) that manufactures, imports or processes

-2,4-Toluene diisocyanate CAS 584-84-9

-2,6-Toluene diisocyanate CAS 91-08-7

-80/20 blend of 2,4-Toluene diisocyanate and 2,6-Toluene diisocyanate CAS 26471-62-5

must complete the CAIR reporting form.

Processors with total parent company sales of less than \$4 million are exempt from the reporting requirements. Facilities are also exempt from reporting if the parent company has total sales of less than \$40 million and production/importation at that site is less than 100,000 lbs.

If you, as a non-exempt processor, use any of these isocyanates to make another material or any end product for distribution in commerce, you must complete the form. This applies even if the isocyanate is totally consumed on site or if the final product is an article or a non-hazardous material.

COMPLIANCE DEADLINES:

The effective date of the rule is February 6, 1989.

NOTE: The following dates include the 30 day extension on filing and notification granted by the EPA on February 8,1989.

Processors must file with EPA using one of the following approaches:

- 1) File report no later than 90 days after your supplier informs you of your reporting requirements. Your supplier must inform you by April 7,1989, so you must have the form completed and filed by July 6,1989.
- File report no later than 90 days after the trade name of the product(s) you use appears in the Federal Register. The supplier must supply the EPA with this list by March 20, 1989 and the EPA must publish this list in the Federal Register within the following four weeks.

Although the regulations provide a third option that allows TDI manufacturers to report on behalf of their customers, because there is site specific and economic information required that the manufacturer would not have available, they will probably not be able to provide this service. Therefore, each non-exempt processor should be prepared to file.

REGULATORY SUMMARY:

The basic purpose of the rule is enable EPA to gather in-depth information on chemicals of concern and to establish a general framework for reporting such information.

This first rule covers 19 chemicals, four of which are toluene diisocyanates- 2,4-TDI, 2,6-TDI, the 80/20 blend of 2,4- and 2,6 and a non-specific TDI that is not on the TSCA Inventory.

The rule requires that all non-exempt manufacturers, importers and processors complete a detailed form for each site at which chemicals containing TDI are handled. Articles, impurities, byproducts and non-isolated intermediates are exempted.

SUGGESTED COMPLIANCE APPROACH:

- Step 1- Determine whether you use any Toluene diisocyanates (TDI) on site. If you do not use TDI- containing materials, you need not report.
- Step 2- If you use TDI-containing materials, determine whether you:

a) have less than \$4 million in sales or

b) have sales of less than \$40 million and TDI production/ importation of less than 100,000 lbs.
If either of these situations applies to your facility, you need not report.

OTHERWISE YOU MUST COMPLETE AND FILE A REPORT.

Because of the length and complexity of the form, the Polyurethane Division of SPI has created a Task Force to assist processors in completing the document. This Task Force is preparing a guidance document and is planning to conduct CAIR workshops in the early spring. For further details, contact SPI in DC at 202-371-5223 or the SPI Polyurethane_Division at 212-351-5425.

STATE AND LOCAL CONCERNS:

There are no known equivalent state or local programs.

REFERENCE DOCUMENTS AVAILABLE FROM EPA:

1) Comprehensive Assessment Information Rule; Final Rule Federal Register Notice December 22,1988 53 FR 51698

2) REPORTING FORM-Comprehensive Assessment Information Rule-EPA Form

7710-52

3) GENERAL INSTRUCTIONS-Comprehensive Assessment Information Rule-EPA Form 7710-52

To obtain any of the above documents, contact EFA at:
TSCA Assistance Office (TS-799)
ATTN: CAIR Form Request, Office of Toxic Substances
Environmental Protection Agency, Room E-543
401 M Street, S.W.
Washington, DC 20460
202-554-1404

REFERENCE DOCUMENTS AND FORMS AVAILABLE FROM SPI:

1) SPI Question and Answer Document for TDI Processors

SPI also has a limited supply of the EPA documents noted above.

CITATIONS:

Statutory: Section 8(a) of the Toxic Substance Control Act(TSCA)

Regulatory: December 22,1988(53FR51698)

CFR CODE: 40 CFR Part 704

Should you need any assistance in complying with the above or have any additional comments or questions, please contact Richard H. LaLumondier, Assistant Director, Technical & Regulatory Affairs (202)371-5223.

CONTINUATION SHEET Page 2

Attachment for 4.02:

- 1. MSDS RUBINATE TDI
 2. MSDS LUPRANATE T-80 TYPE 2
 3. MSDS FOR EACH PRODUCT BELOW:

| Isofoam® | | Isofoam [®] | | Castomer tm | |
|----------|----------|----------------------|----------|------------------------|---------|
| Isofoam® | | Isofoam® | | Castomer tm | |
| Isofoam® | | Isofoam® | | Castomer tm | |
| Isofoam® | | Isofoam® | | Castomer tm | |
| Isofoam® | | Isofoam® | SR-0894A | Castomer tm | E-1114A |
| Isofoam® | SR-0486A | Isofoam® | SR-0968A | Castomer tm | E-1154A |

ICI Polyurethanes Group

West Deptford, New Jersey 08066 Phone, 24 hours: (302) 575-3000 Medical inquiries: (800) 327-8633 2290

07080R

Rev.: F

Date: 02/06/89

SECTION 1 NAME & HAZARD SUMMARY

Material name: RUBINATE TDI

Hazard summary (as defined by OSHA Hazard Comm. Std., 29 CFR 1910.1200):

Physical hazards: Unstable.

Health hazards: Corrosive (eye), irritant (skin, respiratory passages, skin sensitizer), inhalation (TLV), harmful pulmonary (lung) sensitizer.

Based on TDI - harmful (respiratory sensitizer, lung injury).

Read the entire MSDS for a more thorough evaluation of the hazards.

| | | - choroagn | EASTRACTON | <u> </u> | the mazarus. |
|--|-------------|------------|--------------|----------|--------------|
| SECTION 2 INGREDIENTS | | | | 8 | TLV (ACGIH) |
| Toluene diisocyanate, Toluene diisocyanate, | | • | | | 0.005 ppm |
| Toruene directyanace, | Z, G-ISOMEI | (CAS 91-06 | - <i>1</i>) | 20 | Not listed |

Ingredients not precisely identified are proprietary or nonhazardous. Values are not product specifications.

SECTION 3 PHYSICAL DATA

Appearance and odor: Clear, colorless liquid with sharp odor

Boiling point: 484°F, 251.1°C

Vapor pressure (mm Hg at 20°C): 0.02

Vapor density (air = 1): 6.0 Solubility in water: Reacts

pH: No data

Specific gravity: 1.22

% Volatile by volume: No data

SECTION 4 FIRE AND EXPLOSION HAZARD DATA

Flash point: 270°F, 132°C (OC) Autoignition temperature: No data Flammable limits (STP): 0.9-9.5%

Extinguishing media:

Dry chemical, foam, carbon dioxide, halogenated agents. If water is used, use very large quantities. The reaction between water and hot isocyanate may be vigorous.

Special fire fighting protective equipment:

Self-contained breathing apparatus with full facepiece and protective clothing.

SECTION 4 FIRE AND EXPLOSION HAZARD DATA (continued)

Unusual fire and explosion hazards:

Water contamination will produce carbon dioxide. Do not reseal contaminated containers as pressure buildup may rupture them.

SECTION 5 REACTIVITY DATA

Stability:

Stable under normal conditions.

Incompatibility:

This product will react with any materials containing active hydrogens, such as water, alcohol, ammonia, amines, alkalies and acids. The reaction with water is very slow under 50° C, but is accelerated at higher temperatures and in the presence of alkalies, tertiary amines, and metal compounds. Some reactions can be violent.

Hazardous decomposition products:

Combustion products: Carbon dioxide, carbon monoxide. Nitrogen oxides, ammonia. Trace amounts of hydrogen cyanide.

Hazardous polymerization:

May occur. High temperatures in the presence of alkalies, tertiary amines, and metal compounds will accelerate polymerization. Possible evolution of carbon dioxide gas may rupture closed containers.

SECTION 6 HEALTH HAZARD ASSESSMENT

General:

The health hazard assessment is based on an evaluation of the chemical composition together with information from a search of the scientific literature and other commercial sources.

Ingestion:

The acute oral LD50 in rat is reported to be 5,800 mg/kg. Relative to other materials, this material is classified as "practically nontoxic" by ingestion. In humans, irritation or chemical burns of the mouth, pharynx, esophagus and stomach can develop following ingestion. Injury may be severe and cause death.

Eye contact:

This material is reported to induce chemical burns in rabbit eye studies; a similar degree of eye injury may develop after contact with human eyes.

Skin contact:

This material is reported to be severely irritating in rabbit dermal irritation studies and will probably irritate human skin. Skin sensitization and irritation may develop after repeated and/or prolonged contact with human skin.

Skin absorption:

The acute dermal ${\rm ID}_{50}$ in rabbit is reported to be above 16 g/kg. Systemically toxic concentrations of this product will probably not be absorbed through human skin.

SECTION 6 HEALTH HAZARD ASSESSMENT (continued)

Vapors and aerosols can irritate eyes, nose and respiratory passages. TDI wapors are easily generated and are lethal to rats via inhalation at concentrations below 10 ppm. A no effect level for rats of about 0.1 ppm was determined from a subacute study. This and other data indicate the wapors and aerosols of TDI are highly toxic relative to the wapors of other compounds. Vapors and aerosols of TDI strongly irritate the upper and lower respiratory tract. Human experience indicates that TDI will induce an asthma-like respiratory sensitization in some individuals. If applications which involve spraying (e.g. aerosols and mists) or if elevated temperatures are used, even higher vapor concentrations may result and introduce a greater degree of risk of inhalation injury. Rat and mouse toxicity and carcinogenicity studies were conducted with two years of inhalation exposure to vapors of TDI at concentrations of 0.05 and 0.15 ppm. No indication of carcinogenic effect was observed. However, mice exposed to 0.15 ppm for two years showed reduced weight gain and signs of irritation in the upper and lower respiratory tract. No other effect of toxicological significance was observed.

Other effects of overexposure:

There are two studies which allege that workers exposed to TDI at or near the current TLV have experienced impaired ventilatory capacities. These findings have not been independently substantiated. The National Toxicology Program (NTP) 4th Annual Report on Carcinogens (1985) lists TDI as a substance that may reasonably be anticipated to be a carcinogen based on a NTP Technical Report. In the cited study, laboratory animals gavaged TDI in corn oil developed cancer. In our view, the inhalation study is of more potential biological relevance to man.

First aid procedures:

Skin: Wash material off of the skin with plenty of soap and water. If redness, itching, or a burning sensation develops, get medical attention. Wash contaminated clothing and decontaminate footwear before reuse. Eyes: Immediately flush with plenty of water. After initial flushing, remove any contact lenses and continue flushing for at least 15 minutes.

Have eyes examined and treated by medical personnel.

Ingestion: Do not induce vomiting. Give 1 or 2 glasses of water to drink and refer person to medical personnel. (Never give anything by mouth to an unconscious person.)

Inhalation: Remove victim to fresh air. If not breathing, give artificial respiration, preferably mouth-to-mouth. If breathing is labored, give oxygen. Consult medical personnel.

Note to physician: Probable mucosal damage may contraindicate the use of gastric lavage following ingestion.

SECTION 7 SPILL OR LEAK PROCEDURES

Steps to be taken in case material is released or spilled:

Wear skin, eye, and respiratory protection during cleanup. Soak up material with absorbent and shovel into a chemical waste container. Cover container, but do not seal, and remove from work area. Prepare a decontamination solution of 0.2-5% liquid detergent and 3-8% concentrated ammonium hydroxide in water (5-10% sodium carbonate may be substituted for the ammonium hydroxide). Follow the precautions on the supplier's material safety data sheets. All operations should be performed by trained personnel familiar with the hazards of the chemicals used. Treat the spill area with the decontamination solution, using about 10 parts of solution for each part of the spill, and allow it to react for at least 10 minutes. Carbon dioxide will be evolved, leaving insoluble polyureas. For major spills, call CHEMTREC (Chemical Transportation Emergency Center) at 800-424-9300.

Disposal method:

Slowly stir the isocyanate waste into the decontamination solution described above using 10 parts of the solution for each part of the isocyanate. Let stand for 48 hours, allowing the evolved carbon dioxide to vent away. Neutralize the waste. Neither the solid nor the liquid portion is a hazardous waste under RCRA, 40 CFR 261.

Container disposal:

Drums must be decontaminated in properly ventilated areas by personnel protected from the inhalation of isocyanate vapors. Spray or pour 5-15 liters of decontaminating solution into the drum, making sure the walls are well rinsed. Leave the drum soaking unsealed for 48 hours. Pour out the decontaminating solution and triple rinse the empty container. Puncture or otherwise destroy the rinsed container before disposal.

SECTION 8 SPECIAL PROTECTION INFORMATION

TLV® or suggested control value:

The ACGIH TLV, OSHA PEL, and NIOSH recommendation for TDI is 0.005 ppm 8-hour TWA, 0.02 ppm STEL.

Ventilation:

If needed, use local exhaust ventilation to keep airborne concentrations below the TLV. Follow guidelines in the ACGIH publication "Industrial Ventilation". Exhaust air may need to be cleaned by scrubbers or filters to reduce environmental contamination.

Respiratory protection:

Because of the low vapor pressure, ventilation is usually sufficient to keep vapors below the TLV at room temperatures. Exceptions are when the material is sprayed or heated. If airborne concentrations exceed or are expected to exceed the TLV, use MSHA/NIOSH approved positive pressure supplied air respirator with a full facepiece or an air supplied hood. For emergencies, use a positive pressure self-contained breathing apparatus. Air purifying (cartridge type) respirators are not approved for protection against isocyanates.

SECTION 8 SPECIAL PROTECTION INFORMATION (continued)

Protective clothing:

Gloves determined to be impervious under the conditions of use. Depending on conditions of use, additional protection may be required such as apron, arm covers, or full body suit. Wash contaminated clothing before rewearing. The literature indicates that clothing constructed of butyl rubber, Viton, Silver Shield, Saranex coated Tyvek, as well as some nitrile rubber and polyvinyl alcohol (PVA) coated garments have excellent resistance to permeation by TDI. Clothing constructed of Teflon, as well as some garments constructed of nitrile rubber, natural rubber and PVA exhibited limited resistance to permeation by TDI. Some clothing constructed of natural rubber or polyethylene exhibited little resistance to permeation by TDI. Protective clothing should be selected and used in accordance with "Guidelines for the Selection of Chemical Protective Clothing" published by ACGIH.

Eye protection:

Chemical tight goggles and full faceshield.

Other protective equipment:

Eyewash station and safety shower in work area.

SECTION 9 SPECIAL PRECAUTIONS OR OTHER COMMENTS

Special precautions or other comments:

Prevent skin and eye contact. Observe TLV limitations. Avoid breathing vapors or aerosols. Workers should shower and change to fresh clothing after each shift. A sensitized individual should not be exposed to the product which caused the sensitization. Store in tightly sealed containers to protect from atmospheric moisture. Store in a cool area. Individuals with existing respiratory disease such as chronic bronchitis, emphysema or asthma should not be exposed to isocyanates. These individuals should be identified through baseline and annual evaluation and removed from further exposure. Medical examination should include medical history, vital capacity, and forced expiratory volume at one second.

SECTION 10 REGULATORY INFORMATION

TSCA (Toxic Substances Control Act) Regulations, 40 CFR 710: All ingredients are on the TSCA Section 8(b) Inventory.

CERCLA and SARA Regulations (40 CFR 355, 370, and 372):

Section 313 Supplier Notification. This product contains the following toxic chemicals subject to the reporting requirements of Section 313 of the Emergency Planning and Community Right-To-Know Act of 1986 and of 40 CFR 372: 100% TDI (CAS 584-84-9 and 91-08-7).

State Regulations:

California Proposition 65: No warnings are necessary.

The information herein is given in good faith but no warranty, expressed or implied, is made.

MATERIAL SAFETY BASE Corporation Chemicals Division
100 Cherry Hill Road, Parsippeny, New Jersey 07064, (201) 316-3000

BASF

DATA SHEET

HMIS: H4 F1 R1

PRODUCT NUMBER: 585622 LUPRANATE* T80-Type 2

| PRODUCT NUMBER | , 363022 LUFRAINAT | CEOTION | | |
|--|---|---------------------------------|----------------------|--|
| | • | SECTION | | *Registered Trademark |
| TRADE NAME: LUI | PRANATE* T80-Type 2 | | | |
| CHEMICAL NAME: | Toluene Diisocyanat | e | | |
| SYNONYMS: TD | I; Tolylene Diisocyan | ate FORM | IULA: C | H ₃ C ₄ H ₃ {NCO} ₂ |
| CHEMICAL FAMILY: | Aromatic Isocyanate | s . | | MOL. WGT.: 174.16 |
| | SECTION | III - INGF | REDIEN | ITS |
| COM | PONENT | CAS NO. | % | PEL/TLV - SOURCE |
| LUPRANATE* T80-Ty | pe 2 | | 100 | Not established |
| Contains: 2,4 Toluene Diiso | cyanate | 584-84-9 | 80 | 0.005 ppm; 0.02 ppm STEL ACGIH, OSHA (Final) 0.02*ppm C OSHA (Trans) |
| 2,6 Toluene Diiso | cyanate | 91-08-7 | 20 | 0.005 ppm NIOSH recommen- dation; 0.02 ppm STEL |
| SARA Title III Sec All components are | st. 313: Listed. in TSCA inventory. SECTION I | II - PHYSI | CAI FI | ATA |
| | | | | |
| | INT @760 mm Hg: 484°F. | / N/A | pH: N/ | |
| VAPOR PRESSURE mm | Hg @20 C: 0.01 | | · · · · · | Density (Air=1): 6.0 |
| SPECIFIC GRAVITY OF | R BULK DENSITY: 1.2 | 2 | Freezi | ng Point: 51.8-53.6°F |
| SOLUBILITY IN WATE | | | | |
| APPEARANCE: Cold | orless Liquid | ODOR: Pungent | | INTENSITY: Strong |
| SECTI | ON IV - FIRE A | ND EXPLO | SION | HAZARD DATA |
| FLASH POINT (TEST I | METHOD): 270°F TA | G Open Cup | | AUTOIGNITION TEMP: N/A |
| FLAMMABILITY LIMIT | S IN AIR (% BY VOL) | LOWER: 0.9 | 9% | UPPER: 9.5% |
| EXTINGUISHING MEDIUM | Use water fog, foal | m or CO2 exting | guishing | media. |
| SPECIAL FIREFIGHTING PROCEDURES | Personnel engaged protected against isocyanate vapors. | nitrogen dioxid Firefiahters | de fumes must wea | as well as |
| UNUSUAL FIRE AND EXPLOSION HAZARDS | breathing apparatus Avoid water contam areas; carbon diox | ination in clos | sed conta | iners or confined |
| | EMERGENC) | / TELEPHO | NE NU | IMBER |
| CHEMTREC 800-4: | | 201-316-3000 | | |
| THIS | NUMBER IS AVAILABLE | DAYS, NIGHTS, 1 | WEEKENDS, | AND MULIDAYS |

PRODUCT NUMBER: 585622

ا روحو ا

LUPRANATE* T80-Type 2

SECTION V - HEALTH DATA

TOXICOLOGICAL TEST DATA:

LUPRANATE* T80 2,4 Toluene Diisocyanate

> Rat, Oral LD50 Mouse, Inhalation LC50

RESULT:

Severe eye and skin irritant, sensitizer 5.8 g/kg. 10 ppm/4H

EFFECTS OF OVEREXPOSURE:

The primary routes of exposure to this material are eye or skin contact, and inhalation.

Inhalation of the vapors causes severe irritation to lungs, and pulmonary edema can occur after a serious vapor exposure. Liquid contact causes serious skin and eye burns. Pulmonary sensitization can occur in some individuals leading to asthma-type spasms of the bronchial tubes and difficulty in breathing. Preclude from exposure those individuals having a history of respiratory illness, asthmatic conditions, eye damage or TDI sensitization. Recent studies indicate that overexposure may be associated with chronic lung impairment. In a National Toxicology Program (NTP) study, TDI was carcinogenic when given orally to rats and mice at maximum tolerated doses. TDI was not carcinogenic to rats in a two-year inhalation study. Based on the results of the oral study, TDI was included in the NTP Annual Report on Carcinogens.

FIRST AID PROCEDURES:

Existing medical conditions aggravated by exposure to this material: Pulmonary disorders.

Eyes-Immediately wash eyes with running water for 15 minutes. Get immediate medical attention.

Skin-Wash affected areas with water while removing contaminated clothing. Get immediate medical attention. Launder contaminated clothing before reuse.

Ingestion-If swallowed, DO NOT INDUCE VOMITING. Dilute with water or milk and get immediate medical attention. Never give fluids or induce vomiting if the victim is unconscious or having convulsions.

Inhalation-Move to fresh air. Aid in breathing, if necessary, and get immediate medical attention.

SECTION VI - REACTIVITY DATA

STABILITY:

Stable.

CONDITIONS TO AVOID:

Avoid temperatures >40°C for extended periods of time.

CHEMICAL INCOMPATIBILITY:

Basic compounds, caustic soda, tertiaryamines, watér

HAZARDOUS DECOMPOSITION PRODUCTS:

ODUCTS: TDI vapors, NOx, CO and HCN.

HAZARDOUS POLYMERIZATION:

May occur.

Avoid contamination with moisture

and other products that react with isocyanates.

CONDITIONS TO AVOID: CORROSIVE TO METAL:

No

OXIDIZER: No

SECTION VII - SPECIAL PROTECTION

RESPIRATORY PROTECTION:

Approved respirator for transferring operations or escape. Self-contained breathing apparatus if the P.E.L. is exceeded, or in confined areas or if a leak occurs.

EYE PROTECTION:

Wear fitted goggles or face shield and safety glasses.

PROTECTIVE CLOTHING: Rubber gloves, coverails, boots and rubber apron which must be cleaned after each use.

VENTILATION:

Use local exhaust wherever vapors are generated.

OTHER:

Maintain work area below P.E.L.

| SECTION VIII - ENVII | RONN | ENTAL DATA | |
|--|---------------------------------------|--|---|
| ENVIRONMENTAL TOXICITY DATA: | _ | | |
| Aquatic toxicity rating: TLm 96: 10 p | opm-1 pp | m. | |
| SPILL AND LEAK PROCEDURES: | | | |
| LUPRANATE* T80 is a RCRA-regulated pr | roduct. | Wear protective clothing | ng, |
| evacuate all not involved in the clear | top dru | ms. Decontaminate Spil' | l area with |
| a mixture of 90% water, 8% concentrate | ted ammo | nia and 2% detergent. { RO (lbs): 100 | Dispose of |
| MAZARDOUS SUBSTAINCE SUFERI DIED. | | NU (IDS). | |
| WASTE DISPOSAL METHOD: waste in a RCRA-permitted facility. | | | |
| Incinerate or landfill in a RCRA-per | nitted f | acility. | |
| | | | |
| | | | |
| HAZARDOUS WASTE 40CFR261: Yes | | HAZARDOUS WASTE NL | JMBER: U 223 |
| CONTAINER DISPOSAL: | | | |
| MAZARDOUS WASTE 40011201. | mav be 1 | decontaminant. Empty (| containers, rs are not |
| CONTAINER DISPOSAL: Containers should be neutralized with | may be 1 zardous | decontaminant. Empty of andfilled. If contained waste in a RCRA-licensed | containers, rs are not |
| CONTAINER DISPOSAL: Containers should be neutralized with containing less than 1" of residue, i empty, they must be disposed as a harmonic section in the containing less than 1" of residue, i empty, they must be disposed as a harmonic section in the containing less than 1" of residue, i empty, they must be disposed as a harmonic section in the containing less than 1" of residue, i empty, they must be disposed as a harmonic section in the containing less than 1" of residue, i empty, they must be disposed as a harmonic section in the containing less than 1" of residue, i empty, they must be disposed as a harmonic section in the containing less than 1" of residue, i empty, they must be disposed as a harmonic section in the containing less than 1" of residue, i empty, they must be disposed as a harmonic section in the containing less than 1" of residue, i empty, they must be disposed as a harmonic section in the containing less than 1" of residue, i empty, they must be disposed as a harmonic section in the containing less than 1" of residue, i empty, they must be disposed as a harmonic section in the containing less than 1" of residue, i empty, they must be disposed as a harmonic section in the containing less than 1" of residue, i empty, they must be disposed as a harmonic section in the containing less than 1" of residue, i empty, in the containing less than 1" of residue, in the | may be 1 zardous PPINC | decontaminant. Empty of andfilled. If contained waste in a RCRA-licensed | containers, rs are not d facility. |
| CONTAINER DISPOSAL: Containers should be neutralized with containing less than 1" of residue, i empty, they must be disposed as a harmonic of the containing less than 1" of residue, i empty, they must be disposed as a harmonic of the containing less than 1" of residue, i empty, they must be disposed as a harmonic of the containing less than 1" of residue, if the con | may be 1 zardous PPINC | decontaminant. Empty of andfilled. If contained waste in a RCRA-licensed DATA HAZARDOUS SUBSTANC | containers, rs are not d facility. |
| CONTAINER DISPOSAL: Containers should be neutralized with containing less than 1" of residue, i empty, they must be disposed as a harmonic section in the containing less than 1" of residue, i empty, they must be disposed as a harmonic section in the containing less than 1" of residue, i empty, they must be disposed as a harmonic section in the containing less than 1" of residue, i empty, they must be disposed as a harmonic section in the containing less than 1" of residue, i empty, they must be disposed as a harmonic section in the containing less than 1" of residue, i empty, they must be disposed as a harmonic section in the containing less than 1" of residue, i empty, they must be disposed as a harmonic section in the containing less than 1" of residue, i empty, they must be disposed as a harmonic section in the containing less than 1" of residue, i empty, they must be disposed as a harmonic section in the containing less than 1" of residue, i empty, they must be disposed as a harmonic section in the containing less than 1" of residue, i empty, they must be disposed as a harmonic section in the containing less than 1" of residue, i empty, they must be disposed as a harmonic section in the containing less than 1" of residue, i empty, they must be disposed as a harmonic section in the containing less than 1" of residue, i empty, in the containing less than 1" of residue, i empty, i empty and its less than 1" of residue, i empty, it is not a section in the containing less than 1" of residue, i empty, in the containing less than 1" of residue, i empty, it is not a section in the containing less than 1" of residue, i empty, i empty, i empty, i empty, i empty and it is not a section in the containing less than 1" of residue, i empty, i empt | may be 1 zardous PPINC | decontaminant. Empty of andfilled. If contained waste in a RCRA-licensed DATA HAZARDOUS SUBSTANCE (49CFR CERCLA LIST) | containers, rs are not d facility. |
| CONTAINER DISPOSAL: Containers should be neutralized with containing less than 1" of residue, rempty, they must be disposed as a harmonic sempty, they must be disposed as a harmonic sempty. SECTION IX - SHI D.O.T. PROPER SHIPPING NAME (49CFR172.101-101-101-101-101-101-101-101-101-101 | may be 1 zardous PPING -102) | decontaminant. Empty of andfilled. If contained waste in a RCRA-licensed DATA HAZARDOUS SUBSTANC (49CFR CERCLA LIST) | containers, rs are not d facility. |
| CONTAINER DISPOSAL: Containers should be neutralized with containing less than 1" of residue, is empty, they must be disposed as a harmonic service. SECTION IX - SHI D.O.T. PROPER SHIPPING NAME (49CFR172.101-Toluene Diisocyanate D.O.T. HAZARD CLASSIFICATION (CFR172.101-1) | may be 1 zardous PPING -102) | decontaminant. Empty of andfilled. If contained waste in a RCRA-licensed in a RCRA-licens | containers, rs are not d facility. |
| CONTAINER DISPOSAL: Containers should be neutralized with containing less than 1" of residue, rempty, they must be disposed as a had SECTION IX - SHI D.O.T. PROPER SHIPPING NAME (49CFR172.101-Toluene Diisocyanate D.O.T. HAZARD CLASSIFICATION (CFR172.101-1) PRIMARY Poison B | PPINC -102) 02) | decontaminant. Empty of andfilled. If contained waste in a RCRA-licensed DATA HAZARDOUS SUBSTANC (49CFR CERCLA LIST) YesTDI REPORTABLE QUANTITY SECONDARY | containers, rs are not d facility. E |
| CONTAINER DISPOSAL: Containers should be neutralized with containing less than 1" of residue, is empty, they must be disposed as a harmonic service. SECTION IX - SHI D.O.T. PROPER SHIPPING NAME (49CFR172.101-Toluene Diisocyanate D.O.T. HAZARD CLASSIFICATION (CFR172.101-1) PRIMARY | PPINO -102) 02) | decontaminant. Empty of andfilled. If contained waste in a RCRA-licensed DATA HAZARDOUS SUBSTANC (49CFR CERCLA LIST) YesTDI REPORTABLE QUANTITY SECONDARY | containers, rs are not d facility. EE (RQ) 100 1b |
| CONTAINER DISPOSAL: Containers should be neutralized with containing less than 1" of residue, rempty, they must be disposed as a had SECTION IX - SHI D.O.T. PROPER SHIPPING NAME (49CFR172.101-Toluene Diisocyanate D.O.T. HAZARD CLASSIFICATION (CFR172.101-1) PRIMARY Poison B | PPINO -102) D.O.T. REQU | decontaminant. Empty of andfilled. If contained waste in a RCRA-licensed in a RCRA-licens | containers, rs are not d facility. EE (RQ) 100 lb |

Toluene Diisocyanate-Poison B-UN 2078 RQ 100 lbs. *** Placarded: POISON ***

CC NO.

190

UN/NA CODE2078

DATE PREPARED: 4 / 17 / 86

UPDATED:

5 / 25 / 89

WHILE BASE CORPORATION BELIEVES THE DATA SET FORTH HEREIN ARE ACCURATE AS OF THE DATE HEREOF, BASE CORPORATION MAKES NO WARRANTY WITH RESPECT THERETO AND EXPRESSLY DISCLAIMS ALL LIABILITY FOR RELIANCE THEREON. SUCH DATA ARE OFFERED SOLELY FOR YOUR CONSIDERATION, INVESTIGATION, AND VERIFICATION.

SECTION X - PRODUCT LABEL

LUPRANATE* T80

DANGER: POISON HARMFUL IF INHALED.

CONTACT WITH EYES AND SKIN RESULTS IN SERIOUS BURNS. INHALATION OF VAPORS CAUSES SEVERE IRRITATION TO LUNGS. PULMONARY EDEMA MAY OCCUR. PULMONARY SENSITIZATION CAN OCCUR IN SOME INDIVIDUALS, LEADING TO ASTHMA-TYPE SPASMS OF THE BRONCHIAL TUBES AND DIFFICULTY IN BREATHING. INDIVIDUALS WITH A HISTORY OF RESPIRATORY ILLNESS, ASTHMATIC CONDITIONS, EYE DAMAGE OR TDI SENSITIZATION SHOULD NOT BE EXPOSED TO THIS PRODUCT.

SHOULD NOT BE EXPOSED TO THIS PRODUCT.
IN AN NTP STUDY, TDI WAS CARCINOGENIC TO RODENTS GIVEN HIGH ORAL DOSES AND IS INCLUDED IN THE NTP ANNUAL REPORT ON CARCINOGENS. TDI WAS NOT CARCINOGENIC TO RATS IN A TWO-YEAR INHALATION STUDY.

Use with local exhaust. Wear an approved respirator or self-contained breathing apparatus, fitted goggles or face shield and safety glasses, rubber gloves, coveralls, boots, apron and other protective clothing as necessary to prevent contact.

FIRST AID:

Eyes-Immediately wash eyes with running water for 15 minutes.

Get immediate medical attention.

Skin-Wash affected areas with water while removing contaminated clothing. Get immediate medical attention. Launder contaminated clothing before reuse.

contaminated clothing before reuse.

Ingestion-If swallowed, DO NOT INDUCE VOMITING. Dilute with water or milk and get immediate medical attention. Never give fluids or induce vomiting if the victim is unconscious or having convulsions. Inhalation-Move to fresh air. Aid in breathing, if necessary, and get immediate medical attention.

HANDLING AND STORAGE: Keep containers closed and store in a well-ventilated place. Outage of container should be filled with dry inert gas at atmospheric pressure to avoid reaction with moisture. Contamination by moisture or basic compounds can cause dangerous pressure buildup in closed container. Store Store above 60 F to prevent freezing and isomer separation. If solidified, do not exceed 95 F while thawing to prevent discoloration. Mix before using.

IN CASE OF SPILLS OR LEAKS: Material is a RCRA-regulated product. Spills should be contained, absorbed and placed in suitable containers for disposal in a RCRA-licensed facility.

IN CASE OF FIRE: Use water fog, foam or CO2 extinguishing media. Firefighters should be equipped with self-contained breathing apparatus and turnout gear for protection against TDI vapors and toxic decomposition products.

EMPTY CONTAINERS: All labeled precautions must be observed when handling, storing and transporting empty containers due to product residues. Do not reuse this container unless it is professionally cleaned and reconditioned.

DISPOSAL: Spilled material, unused contents and empty containers must be disposed of in accordance with local, state and federal regulations. Refer to our Material Safety Data Sheet for specific disposal instructions.

IN CASE OF CHEMICAL EMERGENCY: Call CHEMTREC day or night for assistance and information concerning spilled material, fire, exposure and other chemical accidents 800-424-9300.

ATTENTION: This product is sold solely for use by industrial institutions. Refer to our Technical Bulletin and Material Safety Data Sheet regarding safety, usage, applications, hazards, procedures and disposal of this product. Consult your supervisor for additional information.

FOR INDUSTRY USE ONLY.
CAS No.: 584-84-9; 91-08-7.
Proper Shipping Name: Toluene Diisocyanate, Poison B - UN 2078 RQ
Made in USA.
Polymers
0488

| | | | • |
|--------------------|--|--|---|
| 国國 1 | Q MATERIAL SAFETY D | ATA SHEET | HAZARD RATING 4 — EXTREME |
| | | F | 3 — HIGH Reactivity |
| | PRODUCT E-095 | iOA P | 2 - MODERATE 1 - SLIGHT Toxicity |
| . f | | en e | 0 - INSIGNIFICANT Special |
| rection is | | | |
| 1 | | | EMERGENCY TELEPHONE |
| I I P IN | C. R, STREET, CITY, STATE, ZIP CODE) | | MANUFACTURFR [304] 392-4800 |
| | - · | 21921 | CHEM TREC 1-(800) 424-9300 |
| CHEMICAL NAME | | FORMULA | |
| 3 Reactive | Isocyanates | 4 | Proprietary |
| | | · · · · · · · · · · · · · · · · · · · | |
| SECTION IL | HEMICAL AND PHYSICAL PROPERTIES | CHEMICAL | PHYSICAL |
| 1 | DMPOSITION PRODUCTS | | FORM |
| <u> </u> | of carbon and nitrogen | | 8 Liquid |
| 5 | | | ODOR Sharp Pungent |
| | (KEEP AWAY FROM) | one Acide and Baca | and the last |
| 6 water (Inc | oisture), Alcohols, Amines, Stro | nig actus and bases | APPEARANCE |
| £ _ L | ID HAZARDOUS INGREDIENTS | | lo Liquid |
| 1 | Diisocyanate (TDI)/Polyether Pr | renolymer | COLOR |
| | ocyanate | · Opolymor | SPECIFIC GRAVITY |
| 7 | <u>ilian yang birang bira</u> | | 12 (WATER = 1) 1.04@ 25°C |
| | | | BOILING PT. |
| | IRE AND EXPLOSION DATA | · | 185 <u>•</u> c |
| SPECIAL FIRE FIGHT | TING PROCEDURES Firefighters must be | C.O.C. | 365 |
| equipped to | prevent breathing of vapors or | 26 152 °C 305 ° | MELTING PT. |
| | combustion. Must wear self- | FLAMMABLE LIMITS % | - 1 1 - ······························· |
| contained br | eathing apparatus. | | NDA °F |
| 24 | | 27 LOWER NDAUPPERNDA | SOLUBILITY |
| LUNUSUAL FIRE AND | DEXPLOSION HAZARDS Avoid moisture | EXTINGUISHING AGENTS | IN WATER Reacts |
| ntaminati | on in closed-containers. Reac- | 4 | AT_NA _°CREGCUS_E |
| | isture will generate CO2 which | ™ WATERSPRAY & FOAM | 15 |
| | the container. | WATERFOG DSAND/EART | H % VOLATILE NDA |
| 25 | | 28 _ OTHER | EVAP. RATE |
| SECTIONEN | EACTH HAZARD DATA | | |
| PERMISSIBLE CONC | | | 17 (<u>Water</u> = 1) NDA |
| | | | VAPOR PRESSURE |
| | om - O.S.H.A. TLV for TDI | | |
| EFFECTS OF OVERE | xposure Irritant to eyes & respinches, nausea, coughing, shorthescomfort. May result in respirate | ratory tract. May | VAPOR DENSITY NDA |
| cause neada | iches, nausea, coughing, shortne scomfort May result in respirat | ess of breath, & | NDA NDA |
| | | | pri AS IS - VDA |
| reaction. | ROPERTIES May cause allergic skin Persons with known respiratory | or respiratory allergies should | 20 pH (XXX) NDA |
| | posure to this product. | | * STRONG ACID |
| EMERGENCY FIRST | AID PROCEDURES | | |
| | se of eye contact, flush with p | | 1 1 |
| 32 ELES at Tes | ast 15 minutes. Call a physicia | | STABLE XX |
| | Wash thoroughly with soap and | | 21 |
| 33 SKIN CONTACT | contaminated clothing & discard shoes. Wash clothing before red | | VISCOSITY |
| i . | Remove. from contaminated area | | - SUS |
| 34 INHALATION | onment. Call a physician. If v | | |
| STEWNALA I ROM | -ing, give artificial respirat | | 12 KD22 |
| <u></u> | mouth-to-mouth. If breathing is | | 23 |
| 35 IF SWALLOWED | | oxygen | Viscosity @ 25°C |
| | Call a physician immediately. | 1535011 | 1/25005209 6 25 0 |
| | | | 700 cps |
| *** | | | |

| | IAI LIUAL OAI I | -II DAIA SH | ICCI P | RODUCT | E-095 | OA |
|--|--|--|--|--|--|--|
| | PROTECTION INFORMATI | | . Tan wan in 12 - 22 - 22 - 22 - 22 - 22 - 22 - 22 | | | |
| | D ILOCAL, MECHANICAL, SPEC | | P | ROTECTIVE GLOVE | S | |
| Mechanical to ma | intain vapors belo | or the TDT Tr | 0 00 | Impervio | us rubber | or |
| nechanical, coma | THEATH VAPOLS DET | DAM CHENINT IPA = | 0.02.ppm 3 | plastic | 3 6 1 | |
| 36 | | i tradicionale de Servicio de Companyo de Servicio de Companyo de Servicio de Companyo de Servicio de Companyo Companyo de Companyo de Co | = | YE PROTECTIONS | Salety gog | gles |
| RESPIRATORY PROTECTION (| SPECIFY TYPE) | and the second s | | and lace | shield to | avoid |
| · ' | proved breathing a | onaratus | <u> </u> | splashing | FOLHOMENT | |
| and the second of the second o | | en out of the grant of the second of the sec | | espirator | that provi | des |
| 37 | | | - | fresh air | & splash | apron. |
| 900000000000000000000000000000000000000 | The state of the s | | <u></u> | 21 | | |
| SECTION VI HANDUN | GOESPILES OF LEAKS With adequate ven | vi Alia Bara da | | | | The State of the |
| NOT SEAL THE CONT 50% ammonia and d of eyes and sk wastedisposal | ermiculite, transf AINER (CO ₂ will be etergent. Wear res in during cleanup. | er to a metal congenerated). Wash | ntainer. S n the area r protecti | aturate wi with water ve equipmen | th water b | ut DO |
| 42 | | Company of the Compan | | | a de deservada de la companya de la La companya de la co | |
| ECTIONEVILLISPECTAL | PRECAUTIONIC | | W 122 | | i de la companya di Santa di S | |
| PRECAUTIONS TO BE TAKEN I | N HANDLING AND STORAGE | and History and the second | | | | |
| Avoid con | tact with moisture | Tsocvanates re | act with . | iator and - | orenet- co | |
| which may runt | ure sealed contain | ers Store betwe | en 40 and en 40 and | אסיבי אות פ | a 270a) | /2 |
| | | Door Decime | 70 auid | oo r (5 an | 4 21761 | we tomic |
| ECTION VIII - TRANSPO | | Constitution of the Consti | · · · · · · · · · · · · · · · · · · · | | | . • |
| UNREGULATED X | U.S. D.O.T. PROPER SHIPPING | A CAMPAGE A RESERVE AND A STREET OF THE SECOND STREET | | | | |
| REGULATED [| U.S. D.O.T. HAZARD CLASS | | | • •• | kD. NUM | BER |
| BY D.O.T | 48 NA | | | | 49 NA | |
| TRAMSPORTATION | RQ LABELIST REC | IUIRED | · · · · · · · · · · · · · · · · · · · | | TAS MA | <u> </u> |
| EMERGENCY | 50 51 NA | | e ingress | يتواد | JA11213 | |
| Information | FREIGHT CLASSIFICATION | and the second s | | | A STATE OF THE STA | |
| CHEM TREC | | .c Material/NOIBN | 1 | | | |
| | SPECIAL TRANSPORTATION | | | | | |
| 7-(800) 424-9300 | None . | | 1 | | | |
| CONCLETE | ·a | The second se | | • | | |
| ECTOWIX COMMENT | | | | • | | |
| NOTE: THE FOAM | PRODUCED IS AN ORG | ANIC AND MUST BE | CONSIDERE | D AS COMBU | STILBE. | |
| THE FOAM I | MUST NOT BE LEFT E | XPOSED OR UNPROTE | ECTED. SH | IELD THE FO | DAM FROM | |
| HEAT AND | SPARKS WITH A THER | MAL BARRIER | 4 | Section 1995 | AUGUSTA | |
| | | And the state of t | · · · · · · · · · · · · · · · · · · · | | | |
| | | de la constante de la constant | | and the second s | ada a a a a a a a a a a a a a a a a a a | The second secon |
| SIGNATURE | pare | | s Gervice | Supervisor | | NCA CAGO |
| REVISION DATE | 4185 SENT TO A | ITTN: | | • | DATE | **** |
| SUPERSEDES | | | | <u> </u> | Selection of the Select | i i i i i i i i i i i i i i i i i i i |
| A white the last of the second | 100 (100 m) (1 | | e of the set of wifeway | go bill ag system | 4.1 | |
| | | | | | | |

We believe the statements, technical information and recommendations contained herein are reliable, but they are given without warranty or guarantee of any kind, express or implied, and we assume no responsibility for any loss, damage, or expense, direct or consequential, arising out of their use.

| 國園 MATERIAL SAFETY D. | | HAZARO RATING Fire |
|--|-------------------------------------|--|
| PRODUCT E-1114A | • | N 4 — EXTREME F 3 — HIGH P 2 — MODERATE |
| | | A 1 - SLIGHT Toxicity O - INSIGNIFICANT Special |
| SECTION | l | - Optical |
| | | EMERGENCY TELEPHONE |
| I.P. INC. ACORESS (NUMBER, STREET, CITY, STATE, ZIP CODE) | | MANUFACTURER (3.0.1)392-4800 |
| 2 505 Blue Ball Road Elkton, MD | 21921 | CHEM TREC 1-(800) 424-9300 |
| CHEMICAL NAME OR FAMILY | FORMULA | |
| Reactive Isocyanates | 4 | Proprietary |
| SECTION IL SCHEMICAL AND PHYSICAL PROPERTIES | CHEMICAL | PHYSICAE |
| HAZARDOUS DECOMPOSITION PRODUCTS | | FORM |
| Oxides of carbon and nitrogen | | 8 Liquid |
| INCOMPATIBILITY (KEEP AWAY FROM) | | ODOR Sharp Pungent |
| Water(moisture), Alcohols, Amines, Stro | ong Acids and Base | s 9 TDI Odor |
| 6 Company of the Comp | | AFFEARANCE |
| LIST ALL TOXIC AND HAZARDOUS INGREDIENTS | <u>.</u> . | 10 Liquid |
| Toluene Diisocyanate (TDI)/Polyether Pr | repolymer | (1) Clear Vellow |
| Eree Isocyanate | | SPECIFIC GRAVITY IL OG 0 0- |
| 7 | | |
| SECTION IN FIRE AND EXPLOSION DATA | | BOILING PT. ≥ 177 °C |
| SPECIAL FIRE FIGHTING PROCEDURES Firefighters must be | FLASH POINT (METHOD USE | |
| equipped to prevent breathing of vapors or | 0.0.0. | 13 |
| products of combustion. Must wear self- | 26 152 °C 305 FLAMMABLE LIMITS % | |
| contained breathing apparatus. | PLAMMAGEE LIMITS 76 | NDA of |
| 24 | 27 LOWER NDAUPPERND | A SOLUBILITY |
| UNUSUAL FIRE AND EXPLOSION HAZARDS Avoid moisture | EXTINGUISHING AGENTS | IN WATER |
| ntamination in closed containers. Reac- | I DRYCHEMICAL I CO. | AT_NA _oc Reacts 3 |
| _on with moisture will generate CO2 which | ™ WATERSPRAY & FOAN | |
| may rupture the container. | WATERFOG DSAND/EAF | NDA |
| 25 | 28 _ OTHER | EVAP.RATE |
| SECTION IN HEALTH HAZARD DATA | | |
| PERMISSIBLE CONCENTRATIONS (AIR) | | 17 (Water = 1) NDA |
| | | VAPOR PRESSURE 18 (mm Hg at 20 °C) - 40 . 0 1 1 . |
| 29 0.02 ppm - O.S.H.A. TLV for TDI | | |
| cause headaches, nausea, coughing, shortness chest discomfort. May result in respirate | ratory tract. May | 19 (AIR = 1) NDA |
| chest discomfort. May result in respirat | tory distress. | pH AS IS NDA |
| TOXICOLOGICAL PROPERTIES May cause allergic skin | or respiratory | NDA I |
| reaction. rersons with known respiratory | allergies should | 20 PH (A.A.) |
| avoid exposure to this product. | | STRONG ACID |
| EMERGENCY FIRST AID PROCEDURES In case of eye contact, flush with p | lenty of water fo | STRONG BASE |
| 32 EYES at least 15 minutes. Call a physicia | | STABLE XX |
| Wash thoroughly with soap and | | UNSTABLE |
| 33 SKIN CONTACT contaminated clothing & discard | | |
| shoes. Wash clothing before re- | | VISCOSITY |
| Remove from contaminated area | | 7- AT 100°F |
| 34 INHALATION ONMENT. Call a physician. If v | | th 22 NDA. |
| -ing, give artificial respirat mouth-to-mouth. If breathing is | | 23 |
| 35 IF SWALLOWED | Joxyge | n. Viscosity @ 25°C |
| Call a physician immediately. | JOX / BU | V15C03103 6 23 6 |
| | | 4500 cps |
| NA = NOT APPLICABLE NDA = NO DATA AVAIL | ABLE <± (| LESS THAN >= MORE THAN |

NA = NOT APPLICABLE

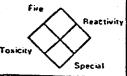
MATERIAL SAFETY DATA SHEET PRODUCT___E-1114A SECTION V - SPECIAL PROTECTION INFORMATION VENTILATION TYPE REQUIRED (LOCAL, MECHANICAL, SPECIAL) PROTECTIVE GLOVES Impervious rubber or Mechanical; to maintain vapors below the TDI TLV = 0.02 ppm 38 plastic EYEPROTECTION_Safety goggles and face shield to avoid RESPIRATORY PROTECTION (SPECIFY TYPE) 39 splashing on face. OTHER PROTECTIVE EQUIPMENT Respirator that provides Use NIOSH approved breathing apparatus. fresh air & splash apron. SECTION VICTHANDLING OF SPILES OF LEAKS PROCEDURES FOR CLEAN-UP With adequate ventilation, cover with an inert absorbent material such as clay or vermiculite, transfer to a metal container. Saturate with water but DO NOT SEAL THE CONTAINER (CO2 will be generated). Wash the area with water containing 50% ammonia and detergent. Wear respirator and other protective equipment for protection of eyes and skin during cleanup. WASTE DISPOSAL Dispose of consistent with Federal, State, and local regulations. SECTIONEVIE SPECIAL PRECAUTIONS PRECAUTIONS TO BE TAKEN IN HANDLING AND STORAGE Avoid contact with moisture. Isocyanates react with water and generate CO2 which may rupture sealed containers. Store between 40 and 80°F (5 and 27°C). SECTION VIII TRANSPORTATION DATA U.S. D.O.T. PROPER SHIPPING NAME UNREGULATED X NA NA U.S. D.O.T. HAZARD CLASS I.D. NUMBER REGULATED NA NA 8Y 0.0.T NA LABELIS) REQUIRED TRANSPORTATION NA EMERGENCY 51 INFORMATION FREIGHT CLASSIFICATION 52 Liquid Plastic Material/NOIBN CHEM TREC SPECIAL TRANSPORTATION NOTES 1-(800) 424-9300 None SECTIONIX COMMENTS NOTE: THE FOAM PRODUCED IS AN ORGANIC AND MUST BE CONSIDERED AS COMBUSTILBE. THE FOAM MUST NOT BE LEFT EXPOSED OR UNPROTECTED. SHIELD THE FOAM FROM HEAT AND SPARKS WITH A THERMAL BARRIER. TITLE Sales Service Supervisor REVISION DATE SENT TO ATTN: SUPERSEDES

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PRODUCT ISOFOAMR E-1154A

| | HAZARD RATING 4 — EXTREME 3 — HIGH 2 — MODERATE 1 — SLIGHT 0 — INSIGNIFICANT |
|-----|--|
| Ν | 4 - EXTREME |
| F | 3 - HIGH |
| ₽ | 2 - MODERATE |
| А | 1 - SLIGHT |
| | 0 INSIGNIFICANT |
| . 1 | |



| SECTIONI | 0 INSIGNIFICANT Special |
|---|--|
| I. P. Inc. | EMERGENCY TELEPHONE MANUFACTURER |
| ADDRESS (NUMBER, STREET, CITY, STATE, ZIP CODE) | (301) 392-4800 CHEM TREC 1-(800) 424-9300 |
| ² 505 Blue Ball Road, Elkton, Maryland 21921 | Cham The C1-(800) 424.9300 |
| CHEMICAL NAME OR FAMILY | FORMULA |
| 10 | |

| ADDRESS (NUMBER, STREET, CITY, STATE, ZIP CODE) | | | 1301 392 CHEM TREC 1-18 | <u>-4800</u> |
|---|---|-------------|--|--|
| ² 505 Blue Ball Road, Elkton, Maryland | 21921 | | CHEM TREC 1:48 | 001424-9300 |
| CHEMICAL NAME OR FAMILY | | FORMULA | | · *** · · · · · · · · · · · · · · · · · |
| 3 Toluene Diisocyanate (TDI) Prepolymer | | PI PI | roprietary | |
| | • | | | |
| SECTION II: CHEMICAL AND PHYSICAL PROPERTIES | - CHEN | MCAL | -PHYS | ICAL |
| HAZARDOUS DECOMPOSITION PRODUCTS | | | FORM | |
| | | •• | 8 liquid | |
| 5 Oxides of Carbon and Nitrogen | • | | ODOR | |
| INCOMPATIBILITY IKEEP AWAY FROM) | | | Sharp Punge TDI Odor | ent : |
| Water (moisture), Alcohols, Amines, Str | cong Acide : | and Rases | APPEARANCE | |
| <u>~1</u> | Cing north | 2110 00000 | 10 Liquid | |
| LIST ALL TOXIC AND HAZARDOUS INGREDIENTS | | | COLOR | |
| Toluene Diisocyanate (TDI) and Toluene | Diisocyanat | e (TDI) | [n] | |
| Prepolymers | | • | SPECIFIC GRAVITY | NDA @ 25 ⁰ C |
| | | | 1 | MDA 6 25 C |
| SECTION III - FIRE AND EXPLOSION DATA | : | - | BOILING PT. | NDA •c |
| SPECIAL FIRE FIGHTING PROCEDURES Firefighters must be | FLASH POINT IME | THOD USED) | | |
| equipped to prevent breathing of vapors | J C.O.C. | | 13 474, 15. 4 4. | —NDA °F |
| or products of combustion. Must wear | NDA •c | •F | MELTING PT. | NDA °c |
| selfcontained breathing apparatus. | FLAMMABLE LIME | rs % | | MDA |
| and a second and a second and a second as | MDA | МДА | 141 | MDH •E |
| IMISTAL SIDE AND SYDLOSION HAZ TOOS | 27 LOWER NDA | OFNITS | SOLUBILITY | |
| UNUS AL FIRE AND EXPLOSION HAZAGES Avoid moisture | 1 | 1 | IN WATER | |
| contamination in closed containers. Reac- | D DRYCHEMICAL | - 1 | ATNA°C | Reacts |
| tion with moisture will generate CO2 which | WATERSPRAY | XI) FOAM | 15 | |
| may rupture the container. | □ WATERFOG □ | SAND/EARTH | % VOLATILE 16 (BY WT %) | NDA |
| 25 | 28 OTHER | | EVAP. RATE | NDR |
| DOTANGE THE ALTERNATION DAMA | | · . | | |
| PCTION TV HEALTH-HAZARD-DATA PERMISSIBLE CONCENTRATIONS (AIR) | · . | | 17 (Water _ = 1) | NDA |
| ETHIROSOLE CONCENTRATIONS (AIR) | | | VAPOR PRESSURE | |
| 0.02 ppm - O.S.H.A. TLV for TDI | | | 18 (mm Hg at 20°C) | ₹ 0.011 |
| | | | VAPOR DENSITY | NDA |
| . Illiteand to eyes a respin | atory tract | May | 19 (AIR = 1) | |
| dause neadaches, nausea, cougning, snorthe | ess of breat | n, & | pH AS IS | NDA |
| eause headaches, nausea, coughing, shortne chest discomfort. May result in respirat May cause allergic skin o | or recoirate | 227 | DHIXXXX | NDA |
| reaction. Persons with known respiratory a | allergies sh | nould | | |
| "lavoid exposure to this product. | | | STRONG ACID | a |
| MERGENCY FIRST AID PROCEDURES | | | STRONG BASE | |
| In case of eye contact, flush with places at least 15 minutes. Call a physician | lency or wat | er for | STABLE | XX |
| Wash thoroughly with soap and | | | UNSTABLE | · |
| | | | 21 | • |
| 3 SKIN CONTACT Contaminated Clothing & discar shoes. Wash clothing before r | | icea | VISCOSITY | |
| Remove from contaminated area | | r envir | SUS | _ |
| inhalation onment. Call a physician. If v | | | 22 AT 100 °F | |
| ing, give artificial respirati | | | The state of the s | NDA . |
| mouth-to-mouth. If breathing i | | | 23 | |
| oxygen. | D GILLICUIC | , grac | _ | 0 |
| Call a physician immediately | | | Viscosity 0 ? | 25°C |
| • • • • • • • • • • • • • • • • • • • | | 11 | < 530 - cps | |
| | · . · . · . · . · . · · · · · · · · · · | · | | |

NA = NOT APPLICABLE

NDA = NO DATA AVAILABLE

<= LESS THAN

>=MORETHAN



PRODUCT ISOFOAMR E-1154A

| DOCTOR INCORPORAÇÃO | The state of the s |
|--|--|
| SECTION:V— SPECIAL-PROTECTION-INFORMATION VENTILATION TYPE REQUIRED ILOCAL, MECHANICAL, SPECIAL: | PROTECTIVE GLOVES |
| • | Impervious rubber or |
| Mechanical; to maintain vapors below the TDI TLV =0.02 ppr | |
| | EYE PROTECTION Safety goggles |
| 36 | and face shield to avoid |
| RESPIRATORY PROTECTION (SPECIFY TYPE) | 39 splashing on face. |
| Use NIOSH approved breathing apparatus. | Respirator that provides |
| (2 A 2 C 3 F) | fresh air & splash apron- |
| 37 | 40 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 |
| SECTION VI - HANDLING OF SPILLS OR LEAKS | A STATE OF THE STA |
| PROCEDURES FOR CLEAN UP With adequate ventilation, cover with an such as clay or vermiculite, transfer to a metal contained NOT SEAL THE CONTAINER (CO will be generated). Wash the at 5% ammonia and detergent. Wear respirator and other proprotection of eyes and skin during cleanup. | r. Saturate with water but bo rea with water containing |
| WASTE DISPOSAL® | The second of the second of |
| And the second of the second o | The second of th |
| Dispose of consistent with Federal, State and local re | |
| SECTION VII—SPECIAL PRECAUTIONS | The state of the s |
| PRECAUTIONS TO BE TAKEN IN HANDLING AND STORAGE | A STATE OF THE STA |
| Avoid contact with moisture. Tsocvanates react with W | ater and generate CO, which |
| may rupture sealed containers. Store between 40 and 80 | F (5 and 27°C). |
| | Liver the state of the first of the state of |
| SECTION VIII - TRANSPORTATION DATA | |
| UNREGULATED W | |
| BY D.O.T. LAY 47 | |
| REGULATED U.S. D.O.T. HAZARD CLASS | I.D. NUMBER |
| BY D.O.T 4B NA | 49 NA |
| TRANSPORTATION RO LABEL(S) REQUIRED | A Company of the Comp |
| EMERGENCY 50 51 NA | |
| INFORMATION FREIGHT CLASSIFICATION | The second secon |
| CHEM TRFC 52 Liquid Plastic Material/NOIBN | |
| SPECIAL TRANSPORTATION NOTES | |
| 46 None 53 None | |
| SECTIONIX—COMMENTS | A CONTRACT OF THE CONTRACT OF |
| NOTE: THE FOAM PRODUCED-IS AN ORGANIC AND MUST BE CONSIDE THE FOAM MUST NOT BE LEFT EXPOSED OR UNPROTECTED. SHIELD 54 HEAT AND SPARKS WITH A THERMAL BARRIER. | THE FOAM FROM |
| | |
| SIGNATURE C. MOOLE /md TITLE Sales Service | |
| REVISION DATE 7/7/87 SENT TO ATTN: | DATE |
| SUPERSEDES | |
| | |
| | |

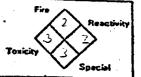
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PRODUCT PE-2A

HAZARD RATING 4 — EXTREMS 3 — HIGH

F 3 - HIGH P 2 - MODERATE A 1 - SLIGHT

0 - INSIGNIFICANT



NA = NOT APPLICABLE

Isofoam® Systems

Triumph Industrial Park, 505 Blue Ball Road P.O. Box 70, Elkton, MD 21921 (301/392-4800)

EMERGENCY TELEPHONE
MANUFACTURFR
13.0-1.) 39.2-48.00
CHEM TREC 1-(800) 424-9300

| CHEMICAL NAME OR FAMILY | The second section is a second section of the second section in the second section is a second section of the second section in the second section is a second section | | • • | |
|--|--|---------------|-------------------------|--|
| Reactive Isocyanates | 4 | Pro | prietary | |
| | | | | |
| SECTION IN CHEMICAL AND PHYSICAL PROPERTIES | CHEMICAU | | PHYSI | CAE |
| HAZARDOUS DECOMPOSITION PRODUCTS | 1 | | FORM Liquid | • |
| Oxides of carbon and nitrogen | • | • | 8 Liquid | |
| s a facility of the second of | | <u> </u> | ^{ODOR} Sharp P | |
| INCOMPATIBILITY (KEEP AWAY FROM) | Anida and Da | | 9 TDI Odo | |
| Water (moisture), Alcohols, Amines, Stro | Ng acros and ba | Ses | APPEARANCE | e de la companya della companya della companya de la companya della companya dell |
| 6 | | | 10 Liquid | • |
| LIST ALL TOXIC AND HAZARDOUS INGREDIENTS | | | COLOR | |
| Toluene Diisocyanate (TDI)/Polyether Pr | еротушет- | | Slight Yel | |
| 2NCO = 28.5 | | 1 | SPECIFIC GRAVITY | 1.23 [©] 25°C |
| | | | BOILING PT. | |
| SECTION IN SEREMAND EXPLOSION DATA | • • | | poleiro, i | _203 •c |
| SPECIAL FIRE FIGHTING PROCEDURES Firefighters must be | FLASH POINT (METHOD US | SED) | | |
| equipped to prevent breathing of vapors or | L | 1 (| 13 | 398 °F |
| products of combustion. Must wear self- | 28 -130 -C -2300 | °F | MELTING PT. | NDA •c |
| contained breathing apparatus. | FLAMMABLE LIMITS % | | 14 | NDA •F |
| 24 | 27 LOWER NDAUPPERN | | | |
| UNUSUAL FIRE AND EXPLOSION HAZAROS Avoid moisture | EXTINGUISHING AGENTS | WA- | SOLUBILITY IN WATER | |
| tamination in closed containers. Reac- | | | - 1 | Reacts 👙 |
| | | | AT_NA _°C | |
| 1 | X WATERSPRAY X FOA | 1 1 | % VOLATILE | |
| may rupture the container. | WATERFOG DSAND/E | ARTH | 16 (BY WT %) | NDA |
| [25] | 28 TOTHER | | EVAP. RATE | |
| SECTION W HEALTH HAZARD DATA | | | | |
| PERMISSIBLE CONCENTRATIONS (AIR) | | <u>-</u> | 17 (<u>Water</u> = 1) | NDA |
| Chilipping concernations (And | | | VAPOR PRESSURE | 40.011 |
| 0.02 ppm - 0.S.H.A. TLV for TDI | | | | |
| | ratory tract. Ma | av | VAPOR DENSITY | NDA |
| EFFECTS OF OVEREXPOSURE Irritant to eyes & respicause headaches, nausea, coughing, shortness, chest discomfort. May result in respirate | ess of breath, & | | 13 12 | |
| | | | pH AS IS | NDA |
| TOXXCOLOGICAL PROPERTIES May cause allergic skin reaction. Persons with known respiratory | or respiratory | ,, | 20 pH (XXX.) | NDA |
| | allergies shoul | _{TO} | - | |
| avoid exposure to this product. | | | STRONG ACID | |
| EMERGENCY FIRST AID PROCEDURES In case of eye contact, flush with p | lenty of water f | for | STRONG BASE | |
| 32 EYES at least 15 minutes. Call a physicia | | | STABLE | XX |
| Wash thoroughly with soap and | | | UNSTABLE | O |
| the state of the s | | | 21 | · · |
| shoes. Wash clothing before re- | | | VISCOSITY | • |
| Remove.from contaminated area | | vir- | SUS AT 100 °F | |
| 34 INHALATION Onment. Call a physician. If v | | | 22 | NDA |
| -ing, give artificial respirat | | | 23 | |
| mouth-to-mouth. If breathing is | | | 23) | |
| 35 IF SWALLOWED | Joxye | | Viscosity @ 2 | 25°C ≈ |
| Call a physician immediately. | | • | | |
| | | • 1 | | |

PRODUCT_PE-2A

| SECTION V SPECIAL | PROTECTIONIN | FORMATION | | | | | _ |
|--|--|---|--|---------------------------------------|--|----------------|---|
| VENTILATION TYPE REQUIRE | D (LOCAL, MECHA | VICAL, SPECIAL) | | | PROTECTIVE GLOVES | | |
| Mechanical; to ma | intain vapo | ors below th | e:TDI TLV = | mag: \$0.0 | Impervious | rubber or | |
| | āđ. | | | Prom. Prin. | EYE PROTECTION Saf | ety goggl | es |
| 36 | | 4 | 5. 2. T | | and face shi | eld to av | oid |
| RESPIRATORY PROTECTION (| • -• | • • | | į | 39 splashing on | face. | |
| Use NIOSH app | proved brea | cning appara | acus. | e e e e e e e e e e e e e e e e e e e | Respirator tha | t provide | |
| 37 | | | 1 - (a) - (b) - (b | • | fresh air & | splash ap | ron. |
| SECTION VI HANDLING | GOFSPILLSOR | LEAKS | | | | 200 | |
| PROCEDURES FOR CLEAN-UP SUCH AS CLAY OF VENTON NOT SEAL THE CONT. 50% ammonia and dependent of eyes and sk | MAINER (CO ₂ Letergent. W | transfer t will be gen ear respira | o a metal co erated). Was | ontainer. sh the are | Saturate with | water but | DO |
| Dispose of C | consistent v | vith Federal | ., State, an | d local re | egulations. | | ******* |
| SECTION VIVE SPECIALE | MATERIAL PROPERTY OF STREET | | | | | | |
| PRECAUTIONS TO BE TAKEN I | | TORAGE | | | | er er e | |
| | 4. | | ocvanates r | eact with | water and gene | mote co- | |
| which may rupt | ure sealed | containers. | Store betw | een 40 and | d 80°F (5 and 2 | 7°C). | |
| ECTION VIII THANSPO | DRIATIONDAT | ii . | | | And the same of th | | |
| UNREGULATED X | U.S. D.O. <u>L. P</u> ROP | ER SHIPPING NAME NA | 702.7 ₁ | | | | 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 |
| REGULATED BY D.O.T | U.S. D.O.T. HAZA | RD CLASS NA | | | • | 1.D. NUMBER | 1 3 3 5 5 5 5 5 5 5 5 5 5 5 5 5 5 5 5 5 |
| TRANSPORTATION EMERGENCY | 80 L | ABELIS) REQUIRED NA | | | | | |
| INFORMATION | FREIGHT CLASSIF | | | | | | |
| CHEM TREC | 52 Liquid | Plastic Ma | terial/NOIB | V | | | |
| 1-(800) 424-9300 | | ORTATION NOTES | | | * * * | • | |
| :6 | 53 None | | | | | | |
| ECTIONIX COMMENT | 'S | • | | | | | |
| NOTE: THE FOAM IN THE FOAM IN HEAT AND S | PRODUCED IS MUST NOT BE SPARKS WITH | LEFT EXPOSE | ED OR UNPROT | E CONSIDER TECTED. S | RED AS COMBUSTI SHIELD THE FOAM | LBE. FROM | • |
| | est of the control of | al de la companya de | | | | Far. 1985 | |
| SIGNATURE | 1/ vare | | | s Gervice | Supervisor | 注张。第 第二 | |
| REVISION DATE | 1186 | SENT TO ATTN:_ | | • | | DATE | |
| SUPERSEDES | and the second of the second o | | · · · · · · · · · · · · · · · · · · · | •••• | | | |
| , | e e e e e e e e e e e e e e e e e e e | | | | | | |
| 178 | | | - | - NE | | | |
| Ve helieve the stateme | | | | | | | |

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MATERIAL SAFETY DATA SHEET HAZARD RATING 4 - EXTREME 3 - HIGH Reactivity PRODUCT __ 2 - MODERATE F-0071A 1 - SLIGHT Toxicity 0 - INSIGNIFICANT Isofoam® Systems EMERGENCY TELEPHONE Triumph Industrial Park, 505 Blue Ball Road MANUFACTURER P.O. Box 70, Elkton, MD 21921 (301/392-4800) 3011 392-4800 CHEM TREC 1-(800) 424-9300 CHEMICAL NAME OR FAMILY FORMULA Reactive Isocyanates Proprietary SECTION IN CHEMICAL AND PHYSICAL PROPERTIES CHEMICAL PHYSICAL HAZARDOUS DECOMPOSITION PRODUCTS FORM Oxides of carbon and nitrogen Liquid 8 1.20000 ODOR INCOMPATIBILITY (KEEP AWAY FROM) 40 Water (moisture), Alcohols, Amines, Strong Acids and Bases TDI Odor APPEARANCE ß LIST ALL TOXIC AND HAZARDOUS INGREDIENTS 10 Liquid Toluene Diisocyanate (TDI)/Methylenediphenyl Diisocyanate COLOR (MDI) and Polyether Prepolymer with 29% Free Isocyanate. 11 Dark Brown SPECIFIC GRAVITY 1.15@ 25°C 12 (WATER = 1) BOILING PT. SECTION IN FIRE AND EXPLOSION DATA SPECIAL FIRE FIGHTING PROCEDURES Firefighters must be 128 -°C FLASH POINT (METHOD USED) equipped to prevent breathing of vapors or 263 C.O.C. °F roducts of combustion. Must wear self-148_°c_ MELTING PT. NDA °C FLAMMABLE LIMITS % contained breathing apparatus. NDA NDA 27 LOWER CALIFORE AND EXPLOSION HAZARDS Avoid moisture SOLUBILITY EXTINGUISHING AGENTS ---: IN WATER contamination in closed containers. Reac-Reacts M DRYCHEMICAL X CO. ion with moisture will generate CO2 which WATERSPRAY X FOAM % VOLATILE may rupture the container. □ WATERFOG □ SAND/EARTH Nil 28 OTHER EVAP. RATE BECTION TV - HEALTH HAZARD DATA PERMISSIBLE CONCENTRATIONS (AIR) NDA VAPOR PRESSURE 0.02 ppm - O.S.H.A. TLV for TDI 18 mm Hg at 20 °C; NDA EFFECTS OF OVEREXPOSURE Irritant to eyes & respiratory tract. May cause headaches, nausea, coughing, shortness of breath, & chest discomfort. May result in respiratory distress. VAPOR DENSITY NDA(AIR = 1)NDA TOXICOLOGICAL PROPERTIES May cause allergic skin or respiratory reaction. Persons with known respiratory allergies should pH AS IS NDA) Hq 20 avoid exposure to this product STRONG ACID in case of eye contact, flush with plenty of water for STRONG BASE 32 sta at least 15 minutes. Call a physician. STABLE Wash thoroughly with soap and water. Remove UNSTABLE 1 contaminated clothing & discard contaminated 33 SWH CONTACT shoes, Wash clothing before reuse. VISCOSITY. <106 € Remove from contaminated area to fresh air envir-SUS 100 0B > 🗆 AT 100 % onment. Call a physician. If victim is not breath 34 WHALATION -ing, give artificial respiration, preferably mouth-to-mouth. If breathing is difficult, 23 A SWALLOWED

NDA = NO DATA AYAHABLE

Call a physician immediately.

HA - NOT AMPLICABLE

<= LESSTHAM

>= MORE THAN

Viscosity @ 25°C

120 cps

| MATERIAL S. | AFETY DATA S | SHEET | PRODUCT F-0071A |
|--|--|----------------------------------|---|
| SECTION V SPECIAL PROTECTION INFOR | MATION | • | |
| VENTILATION TYPE REQUIRED (LOCAL, MECHANICAL | | | PROTECTIVE GLOVES Impervious rubber or |
| Mechanical; to maintain vapors | below the TDI TLV | | |
| 36 | | | ever PROTECTION Safety goggles and face shield to avoid |
| RESPIRATORY PROTECTION ISPECIFY TYPEL | • Company of the Comp | | 39 splashing on face. |
| Use NIOSH approved breathing | ng apparatus. | | OTHER PROTECTIVE EQUIPMENT |
| The second secon | | | Work clothith which provides |
| 37 (2) (2) | | | protection from splashed |
| SECTION VI—HANDLING OF SPILLS OF LEA | KS | | material. |
| PROCEDURES FOR CLEAN-UP With adequate | | | |
| such as clay or vermiculite, tr | ansfer to a metal | container. | Saturate with water but DO |
| NOT SEAL THE CONTAINER (CO2 wil | | | |
| 5 % ammonia and detergent. Wear | | her protect | ive equipment for protection |
| of eyes and skin during clea | nup | enjira. | |
| WASTE DISPOSAL | and the property of the control of t | · San Julius and Vision Provided | |
| Dispose of consistent with | n Federal, State, a | and local re | egulations. |
| 42 | | 1 | |

SECTION VIP SPECIAL PRECAUTIONS

SECTION VIII TRANSPORTATION DATA

PRECAUTIONS TO BE TAKEN IN HANDLING AND STORAGE

Avoid contact with moisture. Isocyanates react with water and generate CO2 which may rupture sealed containers. Store between 60 and 85°F (15 and 30°C).

| UNREGULATED X | U.S. 47 | . D.O.T. PR | OPER SHIPPING NA | | - | ing. w | | |
|--------------------------------------|------------|-------------------|-------------------------|-----------|---------|--|-----|--|
| REGULATED BY D.O.T | υ.s. 48 | . D.O.T. HA | ZARD CLASS NA | | | | • 1 | 1.D. N1.M8ER |
| TRANSPORTATION EMERGENCY INFORMATION | RQ 50 | | LABEL(S) REQ | | | | | The second of th |
| CHEM TREC | FRE | | SIFICATION id Plasti | c Materia | l/NOIBN | in the second of | | |
| 1-(800) 42 4-9300 | SPE 53 | CIAL TRAN None | ISPORTATION N | OTES | | | | |

SECTIONIX - COMMENTS!

NOTE: THE FOAM PRODUCED IS AN ORGANIC AND MUST BE CONSIDERED AS COMBUSTILBE. THE FOAM MUST NOT BE LEFT EXPOSED OR UNPROTECTED. SHIELD THE FOAM FROM HEAT AND SPARKS WITH A THERMAL BARRIER.

| SIGNATURE AUGUSTIC | | TITLE _ | Sales/Servic | e/Super | rvisor | | |
|-----------------------|---------------|-----------------|---------------------------------------|---------------------------------------|-------------|-------|---------|
| REVISION DATE 6/24/85 | SENT TO AFTN: | , in the second | e e e e e e e e e e e e e e e e e e e | · · · · · · · · · · · · · · · · · · · | | DATE_ | 6/24/85 |
| SUPERSEDES | | - | | | | | |
| | | San Sin | | - | | | |

We believe the statements, technical information and recommendations contained herein are reliable, hill they are given without warranty or guarantee of any kind, express or implied, and we assume no respansibility to: pry loss, damage, or expense, direct or consequential, arising out of their use.

| MATERIAL SAFETY | DATA SHEET [| HAZARD RATING | |
|--|--|-----------------------------|--|
| PRODUCT ISOFOAM F-C | | 4 - EXTREME | Fire |
| TOOLOGI TOOTOMIT I - C | /JJOR | 2 - MODERATE | |
| T.C. O.C. | | 0 - INSIGNIFICANT | oxicity |
| Isofoam® Systems | | | Special Company |
| Triumph Industrial Park, 505 Bl | ue Ball Road | EMERGENCY MANUFACTU | :RFR |
| P.O. Box /0, Elkton, MD 2192 | 1 (301/392-4800) | 301) 3 | 92-4800 -1800) 424-9300 |
| CHEMICAL NAME OR FAMILY 3 Reactive Isocyanates | FORMULA | | 1000/424.9300 |
| | | Proprietary | and the second of the second o |
| SECTION IF CHEMICAL AND PHYSICAL PROPERTIES | ************************************** | and the second second | and the same of |
| The second of th | CHEMICAL | FORM PHY | SICAC: |
| Oxides of carbon and nitrogen | | 8 Liquid | |
| INCOMPATIBILITY (KEEP AWAY FROM) | | 0000 | |
| Water (moisture), Alcohols, Amines, Str | ong Acids and Bases | 9 TDI Oc | lor |
| LIST ALL TOXIC AND HAZARDOUS INGREDIENTS | a. Company | TATTEMENANCE | |
| Toluene Diisocvanata (TDT) (15) | | 10 Liquid | |
| (MDI) and Polyether Prepolymer with 29 | Free Tropyanate | Dark E | FOrm |
| | | SPECIFIC GRAVITY | 1.15@ 25°C |
| SECTION IN FIRE AND EXPLOSION DATA | | BOILING PT. | 11126 520C |
| STECIME FIGHTING PROCEDURES Prime Prime | FLASH POINT (METHOD USED) | 7 | 128_ • |
| equipped to prevent breathing of vapors or | , <u>,,,,</u> | 13 | 263 : °F |
| products of combustion. Must wear self- contained breathing apparatus. | 26 148 °C 298 °F | MELTING PT. | |
| 1441 | NDA NDA | 14 | NDA °C |
| UNUSUAL FIRE AND EXPLOSION HAZARDS Avoid Coisture | 27 LOWERUPPER | SOLUBILITY | ob |
| | EXTINGUISHING AGENTS | IN WATER | |
| tion with moisture will generate CO2 which | MATERCHAMICAL XI CO2 | AT°C | Reacts |
| may rupture the container. | NATERSPRAY NE FOAM DWATERFOG DSAND/EARTH | 15 % VOLATILE | a and an energy of the Same |
| | 28 DOTHER | 16 (BY WT %) | Nil |
| SECTION IN HEADTH HAZARD DATA PERMISSIBLE CONCENTRATIONS (AIR) | | EVAP. RATE | |
| PERMISSIBLE CONCENTRATIONS (AIR) | | 17 (| NDA ' |
| 0.02 ppm - O.S.H.A. TLV for TDI | | VAPOR PRESSURE | |
| cause headaches, nausea, coughing, shortne chest discomfort. May result in respirat | | 18 (mm Hg at 20 °C) | NDA |
| ochest discomfort May result in shortne | ss of breath. & | VAPOR DENSITY | NDA |
| reaction. Persons with known respiratory | ory distress. | pH AS IS | NDA |
| reaction. Persons with known respiratory avoid exposure to this product | or respiratory | 20 pH (") | NDA. |
| EMERGENCY FIRST AID PROCESSIONS | And the second of the second o | The second of the second of | |
| - III Case of eve contact fine | enty of water for | STRONG ACID | |
| | | STRONG BASE | D |
| "Wall UNOTOURNIV WITH GOOD and I | | UNSTABLE " | |
| shoes. Wash clothing before now | | 21 5 | 7- No. 100 100 100 100 100 100 100 100 100 10 |
| Tomove iron contaminated area to | 6 | VISCOSITY SUS | <100 € |
| The state of the s | | AT 100°F | 1000U> |
| | | | |
| FSWALOWED - OO GOOD ILL Dreatning is d | ifficult ofva | 23 | 1 |
| Call a physician immediately. | oxygen. | Viscosity @ 25 | C 120 CDS |
| | P 4 | | |

<= Less than

NOA - NO DATA AVAILABLE

CA = NOTAPPEICABLE

>= MORE THAN

| | A TERIAL | SAFETY DA | TA SHEET | PRODUCT ISOFOA | M ^R F-0538A |
|---|--|--|--|--|--|
| SECTION V SPECIAL | PROTECTIONINFO | RMATION | | | |
| VENTILATION TYPE REQUIRE | ED ILOCAL, MECHANIC | AL. SPECIAL) | | PROTECTIVE GLOVES | |
| | | and the second of the second o | | Importione | rubber or |
| Mechanical; to ma | aintain vapors | s below the TDI | TLV = 0.02 ppm | 133 plastic | and the state of t |
| and the same of | ريون المراكب ا المراكب المراكب المراك | | | EYE PROTECTIONS SE | fety goggles |
| HESPIHATORY PROTECTION | 16 TECIEN TUDES | | | and face sh | rield to avoid |
| | | | | 39 splashing o | n face |
| ose meon ap | proved breach. | ing apparatus. | | OTHER PHOTECTIVE E | |
| 37 | A COMPANY | | | Work clothills | which provides |
| to describe the second | | | | protection 1 | rom splashed |
| SECTION VI HANDLIN | ig of spills or le | AKS | | material | |
| PROCEDURES FOR CLEAN-UP | ' With adequat | e ventilation, | cover with an | inert absorben | t material |
| accuras cray of A | reruitcutite. c | ransier to a mo | etal containon | Caturatath | |
| HOT OPER THE COME | THEMEN ICOS MI | . II Da generated | dl Wach the am | aa ssith ssakasa | |
| Distantioning and a | ie cergent, wea | r respirator ar | nd other protec | tive equipment | for protection |
| 41 Or eyes and Sk | Tu garing cre | anup. | | e Albertan Land (1998). | A Commence of the second secon |
| WASTE DISPOSAL | | <u> 1280 - 1</u> | | | |
| Dispose of | consistent wit | h Fodovol Cto | | | |
| 12 | COISTROGILO MT | m rederal, Sta | te, and local r | egulations. | |
| | | | - 1 | 3. | |
| ECTION VIL SPECIAL RECAUTIONS TO BE TAKEN I | PRECAUTIONS | | | | |
| | and the second s | | | | |
| AVOID CON | itact with moi | sture. Isocyan | ates react with | water and gen | erate CO2 |
| 3 willen may rupt | cure sealed co | intainers. Store | e between 60 and | d 85°F (15 and | 30°c). |
| CTION VIII-TRANSPO | ORTATIONDATA | | | | |
| | U.S. D.O.T. PROPER S | HIPPING NAME | | | |
| UNREGULATED X | | NA THE | | | • |
| | U.S. D.O.T. HAZARD | | <u>. — — — — — — — — — — — — — — — — — — —</u> | | |
| REGULATED BY D.O.T | L | NA | in the second of | | I.D. NUMBER |
| 5] 5, 5,0,, | 48 | 14 Sec. 1997 | | | AN (e) |
| TRANSPORTATION | RO LABE | L(S) REQUIRED | • | | |
| EMERGENCY INFORMATION | 50 51 | NA | <u> </u> | | The second secon |
| | FREIGHT CLASSIFICA | | | | |
| CHEM TREC | | lastic Material | TANOTRN | | |
| 1-(800) 424-9300 | SPECIAL TRANSPORT | ATION NOTES | | | |
| | None - | | | | |
| CTIONIX COMMENT | S | | | | • |
| NOTE: THE FOAM | | V OPCANTO AND A | TICT DE COVOTER | NEID AG GOVERN | e de la companya del companya de la companya del companya de la co |
| THE FOAM N | MIST NOT BE II | TET EVPOSED OF | UNPROTECTED. S | RED AS COMBUST | ILBE. |
| HEAT AND S | SPARKS WITH A | THERMAL BARRIE | ONTROLECTED. S | SHIELD THE FOR | M FROM |
| | or mind with A | A. DHRRIE | • | | |
| | 1 | A SAME THE PROPERTY OF THE PRO | and the second s | | |
| GA. | 111 | and the second s | | A STATE OF THE STA | |
| 1 111 | MANN/ | | | Aren Pana | 4.4 |
| GNATURE | your - | TITLE | Sales/Service | /Supervisor | # # 1 * * * * * * * * * * * * * * * * * |
| SEVISION DATE 6/24/ | 85 SEN | TTO ATIN: | | | |
| SUPERSEDES 5/ 9/ | | F11 117. | | | DATE 6/24/85 |
| CONTRACTORS | (1 | i i | | | |
| | | | | | . 20.4 |

We believe the statements, technical information and recommendations contained herein are reliable, but they are given without warranty or guarantee of any kind; express or implied, and we assume no responsibility to any loss, damage, or expense; direct or consequential, arising out of their use:

| | PRODUCT ISOFOAM ^R | R-1179A F | 4 - EXT 3 - HIGH 2 - MOE | 1: | Reactiv |
|------------------|--|--|--------------------------------|---|-------------------------|
| SECTION | Rigid | | 1 - Stig 0 - Insi | GNIFICANT | Special Special |
| -AANIII | FACTURING DIVISION OR SUBSIDIARY | - | | | |
| [1] I | PI (Strain of the control of the con | | 1 | EMERGENCY T | ELEPHONE |
| | MBER, STREET, CITY, STATE, ZIP CODE) | | | | |
| | | | | CHEM TREC 1 | -4800 (800) 424-9300 |
| CHEMICAL NAM | Blue Ball Road, Elkton, Maryland | 21921 | | | 1800) 424.9300 |
| | | FORMU A | | | |
| 4 B | meric Methylene Diphenyl Isocyana | te (MDI) 1 CH (C | H,NCO) | + Higher | Molecular oligomers |
| SECTION II: | CHEMICAL AND PHYSICAL PROPERTIES | CHEMICAL | | PUV. | ollgomers |
| HAZAKUOUS OI | ECOMPOSITION PRODUCTS | | FORM | -PHYS | SICAL |
| - Oxi | dee of Combon and waken | | - | | |
| | des of Carbon and Nitrogen | | 8 | Liquid | |
| INCOMPATIBILI | TY IKEEP AWAY FROM) | | ODO | | |
| L Wat | er (Moisture) Alcohole | 2. 10 在全国中国的 | 9 | Aromatic | Man |
| 6 and | er (Moisture), Alcohols, Amines, Bases. | Strong Acids | APPE | ARANCE | CuOt- |
| | AND HAZARDOUS INGREDIENTS | | -10 | 1 | |
| | | STATE OF THE PROPERTY OF THE PARTY OF THE PA | COLO | Viscous | ridnid |
| LOT | ymeric Methylene Diphenyl Isocyan | ate (MDI) | 111 | | |
| | | | | Dark Bro | wn 💝 🗎 |
| عدل السالا | octyl Phthalate | | - 130W | ATER = 1 | 0 |
| | The state of the s | A Section of the Control of the Cont | | - · | 1.16 @250 _C |
| SECHONTII —. | FIRE AND EXPLOSION DATA | | | OILING PT. | |
| SPECIAL FIRE FIG | HTING PROCEDURES | FLASH POINT (METHOD USED) | | | ≥207 °c |
| be equipped | Firefighter must | C.O.C. | 13 | | ≥406 °F |
| or products | to prevent breathing of vapors of combustion. Must wear self- | 26 NDA °C °F | | KELTING PT. | |
| 1 | OF COMPOSITION WHAT WAS SAID | FLAMMABLE LIMITS % | | HER CHANGE 1 | NDA °C |
| COLLEGITIED D | preathing apparatus. | A STATE OF | 14 | | 177.0 |
| 24 | | 27 LOWER NDA UPPER NDA | | and British The San | NDA of |
| UNUSUAL FIRE AN | NDEXPLOSION HAZARDS Avoid moisture | EXTINGUISHING AGENTS | S | OLUBILITY | |
| leouraminati | On in closed containers Page | | | N WATER | |
| tion with m | oisture will generate CO which | M DRYCHEMICAL EXCO. | AT. | NA°c | Reacts |
| may rupture | the container. 2 | M WATERSPRAY IXFOAM | 15 | r or graph factor | 200000 |
| | | MATERFOG DSANDIEARTH | 95 | VOLATILE | |
| 25 | | 28 TJ OTHER | 16 (8 | BY WT % | NIL. |
| | | TOLITOTHER | T | EVAP. RATE | -14-11 |
| SECHON TO THE | HEAI TH:HAZADD-DATA | | | | |
| PERMISSIBLE CONC | CENTRATIONS (AIR) | - 10 日 - 10 - 1990年 日本 10 - 10 - 10 - 10 - 10 - 10 - 10 - 10 | 17/ | Water | NIL |
| 0.02 pr | CENTRATIONS (AIR) OM - O.S.H.A. TLV for-MDT | | VAF | OR PRESSURE | |
| 29 - 25 | | | 18 (mi | m Hg at 20°Ci | <0.000005-3 |
| EFFECTS OF OVERE | XPOSIIRS - | | | | |
| Cause head | xposure Irritant to eyes & respiraches, nausea, coughing shortne | atory tract. May | 19) | POR DENSITY | というとは、人人 |
| 30 caise Man | laches, nausea, coughing, shortne | ss of breath, chest | | | |
| TOXICOLOGICAL PE | result in respiratory distress | | | pH AS IS | NDA |
| reaction | may cause allergic skin o | r respiratory | _ | | NDA |
| avoid exp | Persons with known respiratory a course to this product | llergies should | 701 | их х х | NUA |
| ENEDGENCY CIOCX | osure to this product. AID PROCEDURES | and the second second second second | STR | IONG ACID | |
| Flus | AID PROCEDURES | John College of General Land College | 1 | | |
| 32 EYES Call | h with plenty of water for at lease a physician. | ast 15 minutes. | | ONG BASE | |
| 1 | AND DECTOR OF STREET STREET, | | · • | BLE | X 1 |
| | Wash thoroughly with | | | TABLE | 0 |
| 33 SKIN CONTACT | | | 21 | | |
| 100 X 20 X 20 X | A TOTAL TARGET OF THE STATE OF THE TRATE | 19 Uamana a | Vic | | |
| | inated clothing and discard cont | aminated chan- | | COSITY SUS | |
| 32 INHALATION | Wash clothing before reuse. | ammated snoes. | LA AT | 100°F | |
| THALATION | Remove from contaminated | | 22 | | NDA |
| | Remove from contaminated area to | a fresh air en- | <u> </u> | | · LOU |
| 35 IF SWALLOWED | breathing give artificial | victim is not | 23 | Viscosity | B 2500 |
| | | difficul give | 1 | | |
| | oxygen. | TILITORIO, BIVE | <u> </u> | NDA cr | s |
| | Call a physician immeditately. | | 1 | | |
| NA = NOT APP | | - | | | |
| - 1101 K/// | | BLE - <= LESS TO | IAN | | - 4005 |
| | A service of the second real of the second second second | The state of the s | | a analysis to year | MORE THAN |
| | Page | 1012 | | | |
| | Page | | | entre State and State | |
| | | 그는 게 하겠습니다 그 때에는 게 하는다. | | FO | RM NO. 851 (4/83) |
| | | | | | 5 |

| MATERIAL SAFETY DATA SHEET | PRODUCT_ISOFOAMR R-1179A | | | |
|---|--|--|--|--|
| -SECTIONEV SPECIAL PROTECTION INFORMATION | | | | |
| VENTILATION TYPE REQUIRED LOCAL MECHANICAL SPECIAL) | PROTECTIVE GLOVES | | | |
| Mechanical to maintain vapors below the MDI TLV = 0.02ppm | Impervious rubber or 3H plastic | | | |
| 36 HESPIRATORY PROTECTION ISPECIFY TYPE | Safety goggles and face shield to avoid splash- | | | |
| RESPIRATORI FROIZECTION (SI CC. 1 1) (1) | OTHER PROTECTIVE EQUIPMENT | | | |
| Use only NIOSH approved apparatus. | None | | | |
| | 140 | | | |
| SECTION VI — HANDLING OF SPILES OR LEAKS | | | | |
| as clay or vermiculite, transfer to metal container. S SEAL THE CONTAINER(CO, will be generated). Wash the ar ammonia & detergent. Wear respirator and other protect of eyes and skin during clean up. | aturate with water but DO NOT ea with water containing 5% ive equipment for protection | | | |
| WASTE DISPOSAL | | | | |
| Dispose of consistent with Federal, State and local re | milations. | | | |
| | | | | |
| | | | | |
| SECTION VII — SPECIAL PRECAUTIONS PRECAUTIONS TO BE TAKEN IN HANDLING AND STORAGE Avoid contact with moist | | | | |
| water and generate CO which may rupture sealed contain 80°F (15 and 27°C). | ure. Isocyanates react with ners. Store between 40 and | | | |
| SECTION VIII - TRANSPORTALIUNGATA | | | | |
| U.S. D.O.T. PROPER SHIPPING NAME | | | | |
| UNREGULATED NA 44 BY D.O.T. NA U.S. D.O.T. HAZARD CLASS | | | | |
| REGULATED AB None | I.D. NUMBER 49 None | | | |
| TRANSPORTATION RO LABELISI REQUIRED FATERGERICY 50 51 None for domestic transport | tation | | | |
| INFORMATION FREIGHT CLASSIFICATION | | | | |
| CHEM TREC 52 Liquid Plastic Material/NOIBN. Domes | stic - Drums | | | |
| SPECIAL TRANSPORTATION NOTES | | | | |
| | | | | |
| EGTION IX — COMMENTS | | | | |
| THE FOAM PRODUCED IS AN ORGANIC MATERIAL AND MUST IN THE FOAM MUST NOT BE LEFT EXPOSED OR UNPROTECTED. SHEAT OR SPARKS WITH A THERMAL BARRIER. | | | | |

SIGNATURE UNUMU TITLE Sales Service Supervisor

REVISION DATE 9/30/88 SENT TO ATTN:

DATE

Sugge.

We believe the statements, technical information and recommendations contained herein are reliable, but they are given without warranty or guarantee of any kind, express or implied, and we assume no responsibility for any loss, damage, or expense, direct or consequential, arising out of their use.

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| MATERIAL SAFETY D | ATA CUETT IT | | | |
|---|---|--|--|--|
| 型型 题 IVIA I ENIAL SAFEIY U | AIA SHEEL H | AZARD RATING Fire Reactivity | | |
| SR-0486A | . 1_1 | - HIGH - MODERATE | | |
| PRODUCT SR-0486A | - 1 1 1 | - SLIGHT Toxicity | | |
| -C-ATIONEE | 0 | - INSIGNIFICANT , Special | | |
| Isofoam® Systems | TOTAL | EMERGENCY TELEPHONE | | |
| Triumph Industrial Park, 505 | Plue Ball Road | MANUFACTURER | | |
| Thumph musulai raik, 505 | Dide Dail Rode (201/202 4800) | (304) 392-4800 CHEM TREC 1-(800) 424-9300 | | |
| P.O. Box 70, Elkton, MD 21 | 921 (301/392-4800) | CHEW THEO 1-1900/ 424-9300 | | |
| CHEMICAL NAMEORFAMILY Reactive Isocyanates | FORMULA | nonniotanu | | |
| 3 Reactive isocyaliates | | roprietary | | |
| SECTION IE-CHEMICAL AND PHYSICAL PROPERTIES | CHEMICAL | PPYSICAL | | |
| HAZARDOUS DECOMPOSITION PRODUCTS | CHEMICAL | FORM | | |
| Oxides of carbon and nitrogen | | B Liquid | | |
| 5 1 1 1 1 1 1 1 1 1 | | | | |
| INCOMPATIBILITY (KEEP AWAY FROM) | | Sharp Pungent TDI Odor | | |
| Water(moisture), Alcohols, Amines, Stro | ong Acids and Bases | APPEARANCE | | |
| 6 LIST ALL TOXIC AND HAZARDOUS INGREDIENTS | | 10 Amber Liquid | | |
| | | COLOR | | |
| 80/20 2, 4/2, 6 - Toluene Diisocyanat | e Ca 40% | 11 | | |
| 7 CAS: 26471-62-5 | *** | SPECIFIC GRAVITY NDA @ 25°C. | | |
| | | BOILING PT. | | |
| SECTION II FIRE AND EXPENSION DATA | | <u>°c</u> | | |
| SPECIAL FIRE FIGHTING PROCEDURES Firefighters must be | FLASH POINT (METHOD USED) | 0F | | |
| equipped to prevent breathing of vapors or | C.O.C. 26 135 •c 276 •F | MEI TING PT | | |
| products of combustion. Must wear self- | FLAMMABLE LIMITS % | NDA •c | | |
| contained breathing apparatus. | | NDA of | | |
| 24 | 27 LOWER NDAUPPERNDA | SOLUBILITY | | |
| UNUSUAL FIRE AND EXPLOSION HAZARDS Avoid moisture | EXTINGUISHING AGENTS | IN WATER | | |
| ntamination in closed containers. Reac- | E DRYCHEMICAL & CO. | AT_NA _oc Reacts 3 | | |
| ion with moisture will generate CO2 which | WATERSPRAY & FOAM | 15 | | |
| may rupture the container. | WATERFOG DSAND/EARTH | % VOLATILE 16 (BY WT %) NDA | | |
| [25] | 28 _ OTHER | EVAP. RATE | | |
| SECTION IN THEACTH HAZARD DATA | | | | |
| PERMISSIBLE CONCENTRATIONS (AIR) | | 17 (<u>Water</u> = 1) NDA | | |
| | 1 | VAPOR PRESSURE 18 (mm Hg at 20 °C) | | |
| 0.005 ppm - O.S.H.A. TLV for TDI | | | | |
| EFFECTS OF OVEREXPOSURE Irritant to eyes & respicause headaches, nausea, coughing, shortness, chest discomfort. May result in respirate | ratory tract. May | TAPOR DENSITY NDA | | |
| chest discomfort. May result in respirat | ess of breath, & | NDA . | | |
| 10XICOLOGICAL PROPERTIES May cause allergic skin | | pri A3 i3 | | |
| reaction. Persons with known respiratory | allergies should | 20 pH (XXX.) NDA | | |
| avoid exposure to this product. | | | | |
| EMERGENCY FIRST AID PROCEDURES | | STRONG BASE | | |
| In case of eye contact, flush with plants at least 15 minutes. Call a physicia | Ξ. | | | |
| Wash thoroughly with soap and the | UNSTABLE | | | |
| | 21 | | | |
| shoes. Wash clothing before reuse. viscosity | | | | |
| Remove from contaminated area to fresh air covins | | | | |
| INHALATION ONMENT. Call a physician. If victim is not breath 22 NDA | | | | |
| | | | | |
| mouth-to-mouth. If breathing is | difficult, give | 23 2,000 cps @ 25°C | | |
| TIBS IF SWALLOWED | lovugan | Viccosity 6 250c | | |

NA: -NOT APPLICABLE

NDA = NO DATA AVAILABLE

Call a physician immediately.

<= LESS THAN

loxygen.

>=MORE THAN

| MA | TERIAL SAFETY DATA SHEET | PRODUCTSR-0486A |
|--|--|--|
| SECTION V SPECIAL PR | OTECTION INFORMATION | |
| VENTILATION TYPE REQUIRED | LOCAL, MECHANICAL, SPECIALI | PROTECTIVE GLOVES |
| | | Impervious rubber or |
| Mechanical; to main | ntain vapors below the TDI TLV = 0.005 pp | m 38 plastic |
| | | EYEPROTECTION Safety goggles |
| 36 | | and face shield to avoid |
| RESPIRATORY PROTECTION (SP | ECIFY TYPE) | 39 splashing on face. |
| Use NIOSH appr | oved breathing apparatus. | OTHER PROTECTIVE EQUIPMENT Respirator that provides |
| 37 | | fresh air & splash apron. |
| SECTION VI HANDLING | NESSITE OF TEXAS | |
| | with adequate ventilation, cover with an | inert absorbent material |
| | rmiculite, transfer to a metal container | |
| | INER (CO ₂ will be generated). Wash the a | |
| | tergent. Wear respirator and other prote | |
| | | cerve edurbment for brocectron |
| of eyes and skin | during cleanup. | |
| WASTEDISPOSAL | | |
| and the second s | S. E. E. Sarker Dadamal Obaka and land | |
| Dispose of co | nsistent with Federal, State, and local | regulations. |
| 42 | | |
| SECTION VIE SPECIAL PR | IECAUTIONS | |
| PRECAUTIONS TO BE TAKEN IN | | |
| Avoid cont | act with moisture. Isocyanates react wit | th water and generate COo |
| which may mintu | re sealed containers. Store between 40 a | and 800r (5 and 270c) |
| 43 Willelf may ruped | re sealed companions. Books be owedn' to t | 210 00 1 (5 tale 2, 0); |
| SECTION VIII TRANSPOR | TATIONDATA | |
| ************************************** | U.S. D.O.T. PROPER SHIPPING NAME | |
| UNREGULATED X | NA NA | and the second s |
| 34 | 47 | |
| REGULATED | U.S. D.O.T. HAZARD CLASS | LD. NUMBER |
| T. PVOOT | NA | 49 NA |
| | RQ LABELIS) REQUIRED | |
| TRANSPORTATION EMERGENCY | 50 51 NA | |
| incorrection i | FREIGHT CLASSIFICATION | |
| ! | Liquid Plastic Material/NOIBN | |
| LAPIVIJARI. I | SPECIAL TRANSPORTATION NOTES | |
| 1-(800) 424-9300 | None | |
| 46 | 53 NOTE | |
| SECTIONIX COMMENTS | | |
| | · · · · · · · · · · · · · · · · · · · | DEDEN AS COMPLICATI DE |
| | RODUCED IS AN ORGANIC AND MUST BE CONSIL | |
| | UST NOT BE LEFT EXPOSED OR UNPROTECTED. | SHIELD THE FOAM FROM |
| | PARKS WITH A THERMAL BARRIER. | |
| 54 | | |
| ••••• | y | |
| () () () () () () | | |
| SIGNATURE | March TITLE Sales Bervi | ice Supervisor |
| REVISION DATE | 120/85 SENT TO ATTAI | DATE |

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SUPERSEDES

MATERIAL SAFETY DATA SHEET 4 - EXTREME 3 - HIGH PRODUCT ISOFOAM R SR-0609A 2 - MODERATE 1 - SLIGHT 0 - INSIGNIFICANT Special SECTIONL Isofoam® Systems EMERGENCY TELEPHONE MANUFACTURER 1301 | 392-4800 Triumph Industrial Park, 505 Blue Ball Road CHEM TREC 1-(800) 424-9300 P.O. Box 70, Elkton, MD 21921 (301/392-4800) CHEMICAL NAME OR FAMILY Toluene Diisocyanate (TDI) Prepolymer Proprietary SECTION II -- CHEMICAL AND PHYSICAL PROPERTIES CHEMICAL -PHYSICAL FORM HAZARDOUS DECOMPOSITION PRODUCTS B | liquid ODOR Sharp Pungent Oxides of Carbon and Nitrogen 9 TDT Odor INCOMPATIBILITY (KEEP AWAY FROM) APPEARANCE Water (moisture), Alcohols, Amines, Strong Acids and Bases 10 Liquid LIST ALL TOXIC AND HAZARDOUS INGREDIENTS COLOR Toluene Diisocyanate (TDI) and Toluene Diisocyanate (TDI) וין Hazy Yellow SPECIFIC GRAVITY 1.17@ 25°C Prepolymers 12 (WATER = 1) BOILING PT. SECTION III - FIRE AND EXPLOSION DATA 118 SPECIAL FIRE FIGHTING PROCEDURES Firefighters must be FLASH POINT (METHOD USED) 246 C.O.C. equipped to prevent breathing of vapors MELTING PT. 133 °c 273 NDA or products of combustion. Must wear FLAMMABLE LIMITS % NDA selfcontained breathing apparatus. 27 LOWER NDA UPPER NDA UNUSUAL FIRE AND EXPLOSION HAZARDS Avoid moisture SOLUBILITY EXTINGUISHING AGENTS IN WATER MO DRYCHEMICAL XIS CO. NA___°C Reacts contamination in closed containers. Reaction with moisture will generate CO2 which WATERSPRAY X FOAM % VOLATILE may rupture the container. MWATERFOG DSAND/EARTH (BY WT %) NDA 28 CI OTHER EVAP, RATE SECTION IV - HEALTH HAZARD DATA : Water NDA PERMISSIBLE CONCENTRATIONS (AIR) VAPOR PRESSURE 0.011 18 (mm Hg at 20°C) 0.02 ppm - 0.S.H.A. 'TLV for TDI VAPOR DENSITY NDA EFFECTS OF OVEREXPOSURE Irritant to eyes & respiratory tract. May $\{A|R=1\}$ gause headaches, nausea, coughing, shortness of breath, & 30 chest discomfort. May result in respiratory distress. TOXICOLOGICAL PROPERTIES May cause allergic skin or respiratory NDA pH AS IS K X X J Hq NDA reaction. Persons with known respiratory allergies should 31 avoid exposure to this product. STRONG ACID. EMERGENCY FIRST AID PROCEDURES STRONG BASE Я In case of eye contact, flush with plenty of water for STABLE_ XX at least 15 minutes. Call a physician. UNSTABLE. Wash thoroughly with soap and water, Remove 21 contaminated clothing & discard contaminated 33 SKIN CONTACT VISCOSITY shoes. Wash clothing before reuse. SUS Remove from contaminated area to fresh air envir-AT 100 °F onment. Call a physician. If victim is not breath 34 INHALATION ing, give artificial respiration, preferably 23 mouth-to-mouth. If breathing is difficult, give 35 IF SWALLOWED oxygen. Viscosity @ 250c

NDA = NO DATA AVAILABLE

Call a physician immediately

NA = NOT APPLICABLE

<= LESS THAN

3200 cps

HAZARD RATING

>= MORE THAN



PRODUCT ISOFOAM SR 0609A

| SECTION:V- SPECIAL-PROTECTION-INFORMATION | |
|--|--|
| VENTILATION TYPE REQUIRED ILOCAL, MECHANICAL, SPECIALI | PROTECTIVE GLOVES |
| Mechanical; to maintain vapors below the TDI TLV =0.02 I | Impervious rubber or |
| Mechanical; to maintain vapors below one ist is: -eve- | |
| ing the second of the second o | EYEPROTECTION Safety goggles |
| 36 | and face shield to avoid |
| RESPIRATORY PROTECTION (SPECIFY TYPE) | 39 splashing on face. |
| Use NIOSH approved breathing apparatus. | Respirator that provides |
| The second secon | fresh air & splash apron. |
| 37 | |
| SECTION VI — HANDLING OF SPILES OF LEAKS | |
| PROCEDURES FOR CLEAN UP With adequate ventilation, cover with an | n inert absorbent material |
| such as clay or vermiculite, transfer to a metal contain | ler. Saturate with water but bu |
| NOT SEAL THE CONTAINER (CO will be generated). Wash the | area with water containing |
| 5% ammonia and detergent. Wear respirator and other pr | Ofecotive edutioners for |
| protection of eyes and skin during cleanup. | |
| WASTE DISPOSAL | |
| | The second secon |
| Dispose of consistent with Federal, State and local | regulations. |
| 17] | |
| SECTION VII SPECIAL PRECAUTIONS | |
| PRECAUTIONS TO BE TAKEN IN HANDLING AND STORAGE Avoid contact with moisture. Isocyanates react with | water and generate CO Which |
| may rupture sealed containers. Store between 40 and | 80 F (5 and 27 C) |
| may rupture sealed containers. Score between 40 and | 30 1 (3 1111 -) 37. |
| SCOTON VIII - TRANSPORTATION DATA | |
| U.S.D.O.T. PROPER SHIPPING NAME | A le la la mana de la |
| UNREGULATED X | |
| 44 BY D.O.T. 47 NA | I.D. NUMBER |
| REGULATED U.S. D.O.T. HAZARD CLASS | and the second of the second o |
| 45 BY D.O.T 48 NA | 49 NA |
| TRANSPORTATION RQ LABEL(S) REQUIRED | |
| EMERGENCY 50 51 NA | |
| INFORMATION FREIGHT CLASSIFICATION | |
| CHEM TRFC 52 Liquid Plastic Material/NOIBN | |
| SPECIAL TRANSPORTATION NOTES | |
| 16 None | |
| SECTION IX COMMENTS | |
| | DEDEN AC COMPHETTE P |
| NOTE: THE FOAM PRODUCED IS AN ORGANIC AND MUST BE CONSI | D THE FOAM FROM |
| IND LOAN HOLDS HELL TIME | D'IRB COM PROM |
| 54 HEAT AND SPARKS WITH A THERMAL BARRIER. | |
| The second of th | |
| 17./1// | |
| SIGNATURE XXIII Sales Serv | |
| SIGNATURE TITLE BUTES BOT V | |
| REVISION DATE | DATE |
| | |
| SUPERSEDES | |
| | • |
| · · · · · · · · · · · · · · · · · · · | table of the state of the stat |

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ISOFOAM^R SR-0672A

| HAZARD RATING | Fire |
|-------------------|----------|
| 4 - EXTREME | |
| 3 HIGH | |
| 2 - MODERATE | |
| 1 - SLIGHT | Toxicity |
| 0 - INSIGNIFICANT | |
| | |

| 2404 | HAZARD RATING 4 — EXTREME 3 — HIGH 2 — MODERATE 1 — SLIGHT | Fire Reactivity Toxicity |
|------|--|--------------------------|
| | 0 - INSIGNIFICANT | Special |

| | × 1 | 0 - INSI | GNIFICANT | Special |
|--|--------------------------|-----------------------|-------------------------|--------------------------|
| SECTIONI | | | | |
| MANUFACTURING DIVISION OR SUBSIDIARY IPI | | } | EMERGENCY TEL | EPHONE |
| ADDRESS INUMBER, STREET, CITY, STATE, ZIP CODE | | | 1301 392 | -4800 |
| - · · · · · · · · · · · · · · · · · · · | 01001 | I | CHEM TREC 1-18 | 00) 424-9300 |
| 2 505 Blue Ball Road, Elkton, Maryland | 21921 FORMULA | | | |
| 3 Toluene Diisocyanate (TDI) Prepolymer | 4 | Propi | rietarv | |
| | • | | | |
| SECTION II - CHEMICAL AND PHYSICAL PROPERTIES | CHEMICAL | | -PHYSI | CAL |
| HAZARDOUS DECOMPOSITION PRODUCTS | | FOR | | ** **** |
| | | | liquid | |
| 5 Oxides of Carbon and Nitrogen | | 0000 | Sharp Punge | ent. |
| INCOMPATIBILITY (KEEP AWAY FROM) | | . 9 | TDT Odor | |
| Water (moisture), Alcohols, Amines, Str | ong Acids and Base | ₹S | 1.74 | |
| LIST ALL TOXIC AND HAZARDOUS INGREDIENTS | | COL | Liquid | |
| Toluene Diisocyanate (TDI) and Toluene I | Diisocyanate (TDI) | | YELLOW | |
| Propolitimone | W | SPE | CIFIC GRAVITY | 1.11 @ 25 ⁰ C |
| 7 NCO = 15% MAX. | | 12 | WATER = 1) BOILING PT. | |
| SECTION III - FIRE AND EXPLOSION DATA | 3 | . | DUILING P1. | 150 ∘ c |
| SPECIAL FIRE FIGHTING PROCEDURES Firefighters must be | FLASH POINT IMETHOD USED | コト | | 300 •F |
| equipped to prevent breathing of vapors | | 13 | MELTING PT. | |
| 'or products of combustion.Must wear | FLAMMABLE LIMITS % | °F | MECHNGPI. | NDA •c |
| selfcontained breathing apparatus. | PLAIVINIABLE EINITTS TO | 14 | n er ellik | NDA •F |
| 24 | 27 LOWER NDA UPPER NDA | A. | SOLUBILITY | |
| UNUSUAL FIRE AND EXPLOSION HAZARGS Avoid moisture | EXTINGUISHING AGENTS | | IN WATER | |
| | M DRYCHEMICAL XD CO. | AT | NA_°C | Reacts |
| tion with moisture will generate CO2 which | WATERSPRAY X FOAM | 15 | - | |
| may rupture the container. | MATERFOG DSAND/EART | | % VOLATILE (BY WT %) | NDA |
| 25 | 28 OTHER | =1 | EVAP. RATE | |
| DOWNSHIPE: " HEATTH HAZADD DATA | • | | | |
| PERMISSIBLE CONCENTRATIONS (AIR) | | | Water=11 | NDA |
| | | | APOR PRESSURE | € 0.011 |
| 0.02 ppm - O.S.H.A. TLV for TDI | | I ├──┸ | VAPOR DENSITY | |
| EFFECTS OF OVEREXPOSURE Irritant to eyes & respir | atory tract. May | 19 | | NDA |
| cause headaches, nausea, coughing, shortne ol chest discomfort. May result in respirat | ss of breath, & | | en ve re | NDA |
| <u> </u> | ory distress. | | ZIZAHQ K X X 1 Hq | NDA |
| TOXICOLOGICAL PROPERTIES May cause allergic skin on the control of | r respiratory | 20 | P A A A | NDR |
| avoid exposure to this product. | TTOI DECK DITOUTE | | STRONG ACID | |
| EMERGENCY FIRST AID PROCEDURES | ontry of victor for | | STRONG BASE | |
| In case of eye contact, flush with place at least 15 minutes. Call a physician | enry or waren ron | : 1 ` | STABLE | XX |
| Wash thoroughly with soap and | | 21 | JNSTABLE | O |
| - contominated elething a discon | | | | |
| shoes. Wash clothing before r | | | VISCOSITY SUS | |
| Remove from contaminated area | | 1 1 2 2 1 | AT 100 °F | - |
| inhalation onment. Call a physician. If v | | tr 22 | | NDA |
| _ing, give artificial respirati | • | 23 | NDA A | |
| mouth-to-mouth. If breathing i | s difficult, give | | | 0 |
| | | <u> </u> | iscosity 0 | 25 ⁰ C |
| Call a physician immediately | | | NDA cps | . mag |
| NA NOTICE OF THE NAME OF THE PARTY AND A NO DATA AVAIL | ADI 5 | L NAHT 22: | MDA CPS | Lions Tillian |



PRODUCT_____RSOFOAMR SR-0672A

| AND THE PROPERTY OF THE PROPER | · · · · · · · · · · · · · · · · · · · |
|--|--|
| SECTION:V — SPECIAL-PROTECTION-INFORMATION VENTILATION TYPE REQUIRED (LOCAL, MECHANICAL, SPECIAL) | PROTECTIVE GLOVES |
| Mechanical; to maintain vapors below the TDI TLV =0.02 | Impervious rubber or |
| Mechanical, so marnoali vapor | EYE PROTECTION Safety goggles |
| | and face shield to avoid |
| RESPIRATORY PROTECTION (SPECIFY TYPE) | 39 splashing on face. |
| | OTHER PROTECTIVE EQUIPMENT Respirator that provides |
| Use NIOSH approved breathing apparatus. | fresh air & splash apron. |
| 37 | [40] |
| SECTION VI - HANDLING OF SPILES OR LEAKS | • |
| IPROCEDURES FOR CLEAN UP With adequate ventilation, cover with a | n inert absorbent material |
| l such as clay or vermiculite, transfer to a metal contail | ner. Saturace with water but by I |
| NOT SEAL THE CONTAINER (CO will be generated). Wash the 5% ammonia and detergent. Wear respirator and other processing the second secon | rotective equipment for |
| protection of eyes and skin during cleanup. | |
| [41] | |
| WASTE DISPOSAL | |
| Dispose of consistent with Federal, State and local | regulations. |
| DISPOSE OF COMBINET . | |
| SE CTION VII — SPECIAL PRECAUTIONS | |
| PRECAUTIONS TO BE TAKEN IN HANDLING AND STORAGE | ton and generate CO Which |
| Avoid contact with moisture. Isocyanates react with | water and generate to winten |
| may rupture sealed containers. Store between 40 and | 80 F (5 and 21 C). |
| SECTION VIII - TRANSPORTATION DATA | *. * : |
| U.S. D.O.T. PROPER SHIPPING NAME | |
| UNREGULATED V | |
| 47 NA U.S. D.O.T. HAZARD CLASS | I.D. NUMBER |
| REGULATED REGULATED | 49 NA |
| RO LABEL(S) REQUIRED | A STATE OF THE STA |
| TRANSPORTATION EMERGENCY 50 51 NA | |
| INFORMATION FREIGHT CLASSIFICATION | |
| CUEM TOEC 52 Liquid Plastic Material/NOIBN | |
| SPECIAL TRANSPORTATION NOTES | in the state of th |
| 16 53 None | |
| SECTIONIX COMMENTS- | |
| ATTION DE CONCE | DERED AS COMBUSTIBLE |
| NOTE: THE FOAM PRODUCED IS AN ORGANIC AND MUST BE CONSI | D THE FOAM FROM |
| THE FOAM MOST NOT BE LEFT EXTOSED ON ONTHOTESTED. | |
| 54 PLAT AND DIAMED WITH A STANDARD AND AND AND AND AND AND AND AND AND AN | g the state of the |
| A / | The second secon |
| | |
| SIGNATURE TITLE Sales Serv | rice Supervisor |
| REVISION DATE 2/5/88 SENT TO ATTN: | , DATE |
| SUPERSEDES | |
| SUPERSEDES | |
| | |

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| MATERIAL CAFETY D | ATA OUTET E | | · |
|---|-----------------------------------|----------------------------|---|
| MATERIAL SAFETY D | AIA SHEEI | HAZARD RATING 4 — EXTREME | Fire |
| PRODUCT SR-0700A | F | 3 - HIGH 2 - MODERATE | |
| | A | 1 — SLIGHT Toxic | |
| | <u> </u> | 0 - INSIGNIFICANT | ✓ Special |
| Isofoam® Systems | | GENCY TE | |
| Triumph Industrial Park, | 505 Blue Ball Road | FACTURE 11 392 | 2–4800 |
| P.O. Box 70, Elkton, MI | D 21921 (301/392-48 | 300) TREC 1-(8 | 00) 424-9300 |
| CHEMICAL NAME OR FAMILY | FURMULA | | - |
| 3 Reactive Isocyanates | 4 | Proprietary | |
| SECTION IN CHEMICAL AND PHYSICAL PROPERTIES | CHEMICAL | PHYSI | (CAN |
| HAZARDOUS DECOMPOSITION PRODUCTS | | FORM | OA4 |
| Oxides of carbon and nitrogen | | 8 Liquid | 1 12 1 4 4 5 5 6 6 7 6 7 7 7 7 7 7 7 7 7 7 7 7 7 7 |
| 5 INCOMPATIBILITY (KEEP AWAY FROM) | | ODOR 97 | |
| Water (moisture), Alcohols, Amines, Stro | ong Acids and Bases | 9 TDI Odo | |
| 6 | | AFFEARANCE | y in the second |
| LIST ALL TOXIC AND HAZARDOUS INGREDIENTS | | Liquid | |
| Toluene Diisocyanate (TDI)/Polyether Pr | repolymer Free | COLOR Colorle | ss |
| 7 | Isocyana | ate SPECIFIC GRAVITY | 1.1 @ 25 ⁰ C |
| | | BOILING PT. | |
| SECTION IL FIRE AND EXPLOSION DATA | | _ | 41 <u>∘</u> c |
| SPECIAL FIRE FIGHTING PROCEDURES Firefighters must be | FLASH POINT (METHOD USED) C.O.C. | 13 | 115 °F |
| equipped to prevent breathing of vapors or | 26 140°c 285 °F | | NDA °C |
| products of combustion. Must wear self- contained breathing apparatus. | FLAMMABLE LIMITS % | 1 L | NDA °C |
| appar acus. | NDA 27 LOWERUPPER | 14 | _ |
| USUAL FIRE AND EXPLOSION HAZARDS Avoid moisture | EXTINGUISHING AGENTS | SOLUBILITY IN WATER | · |
| itamination in closed containers. Reac- | X DRYCHEMICAL X CO. | AT*C | Reacts |
| tion with moisture will generate CO2 which | E WATERSPRAY E FOAM | 15 | ± 10,500 1 |
| may rupture the container. | WATERFOG SAND/EARTH | % VOLATILE 15 (BY WT %) | Nil |
| 25 | 28 TOTHER | EVAP. RATE | MIT |
| SECTION IN HEALTH HAZARD DATA | | | NT A |
| PERMISSIBLE CONCENTRATIONS (AIR) | | 17 (= 1) VAPOR PRESSURE | NDA |
| 29 0.02 ppm - 0.S.H.A. TLV for TDI | | 18 (mm Hg at 20°C) | · |
| EFFECTS OF OVEREXPOSURE Traitant to over a mani- | not our treet Man | VAPOR DENSITY | 715.4 |
| cause headaches, nausea, coughing, shortnesson chest discomfort. May result in respirat | ess of breath, & | 19 (AIF = 1) | NDA |
| 30 Chest discomfort. May result in respirat | tory distress. | pH AS IS | NDA |
| TOXICOLOGICAL PROPERTIES May cause allergic skin reaction. Persons with known respiratory | or respiratory | 20 pH () | NDA |
| 31 avoid exposure to this product. | arrengies should | 170263 | |
| EMERGENCY FIRST AID PROCEDURES | | STRONG ACID | |
| In case of eye contact, flush with place at least 15 minutes. Call a physicia | lenty of water for | STRONG BASE | |
| Wash thoroughly with soap and w | water. Remove | UNSTABLE | |
| 33 SKIN CONTACT Contaminated clothing & discard | | 21 0% | |
| shoes. Wash clothing before rea | use. | VISCOSITY | <100 □ |
| Remove from contaminated area t | | | 100 OR > 0 |
| 34 INHALATION Onment. Call a physician, If vi | | 22 | |
| -ing, give artificial respirati | | 23 | • |
| F-SWALLOWED Mouth-to-mouth. If breathing is | drilicult, give | | |

NA = NOT APPLICABLE

NDA = NO DATA AVAILABLE

Call a physician immediately.

<= LESS THAN

>=MORE THAN

IPI

MATERIAL SAFETY DATA SHEET

PRODUCT SR-0700A

| SECTION V SPECIAL SI | ROTECTION INFOR | MATION | | | |
|--|--|---|-------------------------------------|--|--|
| VENTILATION TYPE REQUIRED | (LOCAL, MECHANICAL | , SPECIAL) | | PROTECTIVE GLQVES Impervious r | ubber or |
| :chaniçal; to mai | intain vanars | below the TDT | mag S0.0 = V.IT | | |
| ichanthar, co mai | micami vapors | CHOW ONO. 151 | | EYEPROTECTION_Safe | ty goggles |
| 36 | | | | _ and face shie | |
| RESPIRATORY PROTECTION IS | | | | 39 splashing on | |
| Use NIOSH app | roved breathi | ng apparatus. | | OTHER PROTECTIVE EQUIP Respirator that | provides |
| | | | | fresh air & s | plash apron. |
| 37 | | | | | |
| SECTION VI—HANDLING PROCEDURES FOR CLEAN-UP | FOF SPILLS OF LEA | ventilation | cover with an | inert absorbent | material |
| such as clay or venous NOT SEAL THE CONTA 50% ammonia and demonia and ski | ermiculite, tr AINER (CO ₂ wil etergent. Wear | ransfer to a m il be generate r respirator a | etal container. d). Wash the are | Saturate with we ea with water co tive equipment f | nater but DO nataining |
| WASTE DISPOSAL | | | | 140 | alogo de Transporte de la compansión de la Compansión de la compansión |
| in the same of the | | h Podomol St | ate, and local r | egulations. | |
| Dispose of C | Onsistent wit | n rederat, Su | ice, and rocar i | 08077707 | de industrial in the second |
| | | | | | |
| SECTION VIT—SPECIALS | | RAGE | | | |
| | | | nates react with | water and gene | rate CO2 |
| which may rupt | ure sealed co | ntainers. Stor | re between 40 ar | nd 80°F (5 and 2 | 7°C). |
| [-3] | | | <u> </u> | | |
| SECTION VIII TRANSPO | DRTATION DATA! Tu.S. D.O.T. PROPERS | HIDDING NAME | | | / |
| UNREGULATED X | 0.3. D.O.1. PROFERS | NA NA | | | |
| 44 | U.S. D.O.T. HAZARD | | | | I.D. NUMBER |
| REGULATED BY D.O.T | | NA NA | | | 49 NA |
| 45 57 0.0.1 | RQ LABE | L(S) REQUIRED | | | 43 NA |
| TRANSPORTATION EMERGENCY | 50 51 | NA NA | • | | |
| INFORMATION | FREIGHT CLASSIFICA | | , | | |
| CHEN TREC | 52 Liquid P | lastic Materi | al/NOIBN | | 4 |
| CHEM TREC | SPECIAL TRANSPORT | TATION NOTES | and the second | | |
| 1-(800) 424-9300 | None None | | | | |
| SECTION IX COMMENT | rs | | | • | |
| NOTE: THE FRAM | PRODUCED IS A | N ORGANIC AND | MUST BE CONSIDE | ERED AS COMBUSTI | LBE. |
| THE FOAM | MUST NOT BE L | EFT EXPOSED O | R UNPROTECTED. | SHIELD THE FOAP | FROM |
| HEAT AND | SPARKS WITH A | THERMAL BARR | IER. | | |
| 5.4 | | (中間関係の連携・動類の)、第四 。 | | | |
| <u> </u> | 7 | | | | See See 1 |
| SIGNATURE | Upare | τιι | LE <u>Sales/Servi</u> | ce/Supervisor | |
| REVISION DATE | /83 SE | NTTO ATTN | | et a c | DATE |
| | 6/79 | 13 | · | | |
| 181 | | | A Committee of the committee of | | |
| | • | e de la <u>ellectrica de la companya del companya de la companya del companya de la companya de l</u> | | | |

are given without warranty or guarantee of any kind, express or implied, and we assume no responsibility for any less, damage, or expense, direct or consequential, arising out of their use.

MATERIAL SAFETY DATA SHEET HAZARD RATING 4 - EXTREME - HIGH ISOFOAM^R SR-0832A 2 - MODERATE PRODUCT 1 - SLIGHT INSIGNIFICANT Special SECTIONL EMERGENCY TELEPHONE Isofoam® Systems MANUFACTURER 1301 1 392-4800 CHEM TREG 1 (800) 424-9300 Triumph Industrial Park, 505 Blue Ball Road P.O. Box 70, Elkton, MD 21921 (301/392-4800) FORMULA Diisocyanate (TDI) Prepolymer Proprietary SECTION II: CHEMICAL AND PHYSICAL PROPERTIES CHEMICAL -PHYSICAL HAZARDOUS DECOMPOSITION PRODUCTS FORM 8 liquid ODOR Sharp Pungent PTDT Odor APPEARANCE Oxides of Carbon and Nitrogen INCOMPATIBILITY IKEEP AWAY FROM! Water (moisture), Alcohols, Amines, Strong Acids and Bases 10 Liquid LIST ALL TOXIC AND HAZARDOUS INGREDIENTS COLOR Toluene Diisocyanate (TDI) and Toluene Diisocyanate (TDI) 11 Amber Liquid SPECIFIC GRAVITY .10@ 25⁰C Prepolymers 12 (WATER = 1) BOILING PT. >121 SECTION III -- FIRE AND EXPLOSION DATA SPECIAL FIRE FIGHTING PROCEDURES Firefighters must be FLASH POINT (METHODUSED) > 250 C.O.C. equipped to prevent breathing of vapor: MELTING PT. <u>138</u> •c_ NDA or products of combustion. Must wear FLAMMABLE LIMITS % NDA selfcontained breathing apparatus. ۰F 27 LOWER NDA UPPER NDA SOLUBILITY EXTINGUISHING AGENTS UNUSUAL FIRE AND EXPLOSION HAZARDS IN WATER Avoid moisture D DRYCHEMICAL XD CO. AT. NA °C Reacts contamination in closed containers. Reac-15 MATERSPRAY X FOAM tion with moisture will generate CO2 which % VOLATILE may rupture the container. MATERFOG DSAND/EARTH (BY WT %) 16 NDA 28 C OTHER EVAP. RATE SECTION IV - HEALTH HAZARD DATA 17 (Water NDA PERMISSIBLE CONCENTRATIONS (AIR) VAPOR PRESSURE <u>0.011</u> (mm Hg at 20 °C) 0.02 ppm - O.S.H.A. 'TLV for TDI VAPOR DENSITY NDA EFFECTS OF OVEREXPOSURE 19 $\{AIR = 1\}$ Irritant to eyes & respiratory tract. May nausea, coughing, shortness of breath, & rt. May result in respiratory distress. oause headaches, na 30 chest discomfort. pH AS IS NDANDA K X X 1Hq May cause allergic skin or respiratory reaction. Persons with known respiratory allergies should avoid exposure to this product. STRONG ACID **EMERGENCY FIRST AID PROCEDURES** STRONG BASE In case of eye contact, flush with plenty of water for STABLE . at least 15 minutes. Call a physician. UNSTABLE.

NA -= NOT APPLICABLE .

oxygen.

Call a physician

33 SKIN CONTACT

34 INHALATION

35 IF SWALLOWED

NDA = NO DATA AVAILABLE

Wash thoroughly with soap and water. Remove

shoes. Wash clothing before reuse.

contaminated clothing & discard contaminated

ing, give artificial respiration, preferably

Remove from contaminated area to fresh air envir-

onment. Call a physician. If victim is not breath

mouth-to-mouth. If breathing is difficult, give

immediately

<= LESS THAN

21

22

23

VISCOSITY

SUS AT 100 °F

NDA

cps

Company T

>= MORE THAN

NDA



PRODUCT_ISOFOAMR SR-0832A

| SECTION:V- SPECIAL-PROTECTION INFORMATION | |
|--|--|
| VENTILATION TYPE REQUIRED (LOCAL, MECHANICAL, SPECIAL) | PROTECTIVE GLOVES |
| | Impervious rubber or |
| Mechanical; to maintain vapors below the TDI TLV =0.0 | plastic |
| | EYE PROTECTION Safety goggles |
| 36 | and face shield to avoid |
| RESPIRATORY PROTECTION (SPECIFY TYPE) | 39 splashing on face. OTHER PROTECTIVE EQUIPMENT |
| Use NIOSH approved breathing apparatus. | Respirator that provides |
| Ose Mionii aphi oved produiting apparatu | fresh air & splash apron. |
| 37 | 40 |
| SECTIONVI - HANDLING OF SPILLS OR LEAKS | • |
| IPROCEDURES FOR CLEAN-UP With adequate ventilation, cover with | an inert absorbent material |
| such as clay or vermiculite, transfer to a metal cont | ainer. Saturate with water but DO |
| NOT SEAL THE CONTAINER (CO will be generated). Wash t | he area with water containing |
| 5% ammonia and detergent. Wear respirator and other | protective equipment for the textile |
| protection of eyes and skin during cleanup. | |
| WASTE DISPOSAL | |
| | |
| Dispose of consistent with Federal, State and loca | al regulations. |
| .12 | |
| SECTION VII — SPECIAL PRECAUTIONS | |
| PRECAUTIONS TO BE TAKEN IN HANDLING AND STORAGE | |
| Avoid contact with moisture. Isocyanates react wi | th water and generate CO, which |
| may rupture sealed containers. Store between 40 ar | nd 80°F (5 and 27°C). |
| | |
| SECTION VIII - TRANSPORTATION DATA | |
| UNREGULATED X U.S. D.O.T. PROPER SHIPPING NAME | |
| BY D.O.T. A | |
| U.S. D.O.T. HAZARD CLASS | I.D. NUMBER |
| REGULATED NA NA | 49 NA |
| RO LABELISI REQUIRED | The state of the s |
| TRANSPORTATION EMERGENCY 50 51 NA | |
| INFORMATION FREIGHT CLASSIFICATION | |
| Timid Plantia Matamial (NOTEN | |
| CHEM TRFC SPECIAL TRANSPORTATION NOTES . | |
| [1800) 424-9300 (| |
| 53 None | |
| SESTIONIX COMMENTS | |
| NOTE: THE FOAM PRODUCED IS AN ORGANIC AND MUST BE CON | VSIDERED AS COMBUSTIBLE |
| THE FOAM MUST NOT BE LEFT EXPOSED OR UNPROTECTED. SHI | IELD THE FOAM FROM |
| SAHEAT AND SPARKS WITH A THERMAL BARRIER. | |
| 54 IDAT AND DI MIND WITH IT THOUGHD DAMAGE. | |
| | |
| [[]] | |
| SIGNATURE Sales Se | ervice Supervisor |
| SIGNATURE /a/a/a/ | - |
| REVISION DATE SENT TO ATTN: | DATE |
| SUPERSEDES | |
| | |
| | |

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IPI

MATERIAL SAFETY DATA SHEET

HAZARD RATING

N 4 — EXTREME
F 3 — HIGH
P 2 — MODERATE
1 — SLIGHT
O — INSIGNIFICANT

Fire
Reactiv

Reactiv

PRODUCT _____SR-0894A

SECTION

IPI

Isofoam® Systems

Triumph Industrial Park, 505 Blue Ball Road P.O. Box 70, Elkfon, MD 21921 (301/392-4800) EMERGENCY TELEPHONE
MANUFACTURER
(301 392-4800
CHEM TREC 1-(800) 424-9300

| CHEMICAL NAME OR FAMILY | | 1120 1 (000) 424-9300 |
|-------------------------|---------|-----------------------|
| | FORMULA | |
| 3 Reactive Isocuanates | 4 | Proprietaru |

| | | | <u>Proprieta</u> | ry |
|-------------------------|--|--------------------------------|------------------|--|
| SEMIOLD ME | Medical Control of the Control of th | CHEMICAL | | |
| HAZARDOUS DECOM | POSITION PRODUCTS | | FORM | PHYSICAL |
| Ь | | • | | quid |
| 5 Oxides | of carbon and nitrogen | | ODOR L1 | gara |
| INCOMPATIBILITY (KE | EP AWAY FROM) | | - | I Odor |
| Water (| moisture), Alcohols, Ami | ines, Strong Acid | S 1005 1 100 | 1 Odor |
| | | and Bases | | quid |
| • | AZARDOUS INGREDIENTS | •. | | quiu |
| Toluene | Diisocyanate (TDI)/Poly | ether Prepolumer | COLOR | rk Brown |
| 7 | | 4% Free Isocyana | - SPECIFIC GRAV | TTY I |
| | | | 12 (WATER = 1 | 1.15025°C |
| SECTION III GIRE | AND BIPLOSION DA A | | BOILING PT | . 700 |
| SPECIAL FIRE FIGHTING | PROCEDURES | FLASH POINT (METHOD USED) | | |
| Firefighter | s must be equipped to | C.O.C. | 13 | 263 °F |
| prevent bre | athing of vapors or | 26 <u>148</u> °C <u>298</u> °F | MELTING P | |
| inroducte of | | | | " NDA °C |
| self-cont | COMBUSTION. Must wear ained breathing apparatu | NDA | 14 | <i>NDA</i> °F |
| UNUSUAL FIRE AND EX | PLOSION HAZADOS | 27 LOWERUPPER | SOLUBILITY | |
| Aroid moist | ure contamination in | EXTINGUISHING AGENTS | IN WATER | |
| C= sed conta | giners. Reaction with | Ø DRYCHEMICAL Ø CO, | AT | ∘c Reacts |
| moisture wi. | ll generate CO ₂ which | ☑ WATERSPRAY ☑ FOAM | 15 | 2.4 |
| may ruptu | re the container. | □ WATERFOG □ SAND/EARTH | % VOLATILE | |
| 25 | the state of the s | 28 COTHER | 16 (BY WT %) | Nil |
| Graffatt in the | ELE PAZARIDE ON TA | | EVAP. RAT | E |
| PERMISSIBLE CONCENT | RATIONS (AIR) | | 177 | = 1) NDA |
| | TATIONO (AIA) | | VAPOR PRESS | |
| 29 0.02 ppn | n - O.S.H.A. TLV for TDI | | 18 (mm Hg at 20 | |
| EFFECTS OF OVEREXPO | SURE | | VAPOR DENS | SITY |
| May_cause | SURE Irritant to eyes & re headaches, nausea cough & chest discomfort.May i | spiratory tract | 19 (AIR = 1 | |
| 30 of breath | & chest discomfort. May | esult in respira | torn | IS NDA |
| | | | OFY pHAS | $\frac{NDA}{NDA}$ |
| | | allergies should | 20 PH (| N DA |
| EMERGENCY FIRST AID | SUTE TO This product | | STRONG ACID | |
| In case of | eue contac fluch with -la-t | | STRONG BASI | and the state of t |
| 32 EYES at leas | t 15 minutes. Call a physic | y of water for | STABLE | |
| - New Perforance of the | Timinates. Call a physic. | lan. | UNSTABLE_ | |
| 33 SKIN CONTACT | Wash thoroughly with soap & | water. Remove | 21 | |
| 33 SKIN CONTACT | contaminated clothing & disc | card contaminated | VISCOSITY | 1 |
| | shoes. Wash clothing before | e reuse. | SUS | <100 □ |
| 14 INHALATION | Remove from contaminate area | to fresh six | 22 AT 100 °F | 100 OR > 🗆 |
| | environment. Call a physics | ian. If victim | | |
| | is not breathing, give artif | icial recrimation | 23 | |
| 35 IF SWALLOWED | preferably mouth-to-mouth. | If breathing is | Wines - 11 | 0050- |
| | difficult, give oxygen. | LE DEGREENING IS | Viscosity (| @25°C 130 cps |
| | Call a physician immediately | | | |

NA = NOT APPLICABLE

NDA = NO DATA AVAILABLE

<= LESS THAN

>=MORETHAN



| SR-0894A | |
|----------|--|
| PRODUCT | |

| SECTION V SPECIAL PROTECTION INFORMATION | |
|---|---|
| VENTILATION TYPE REQUIRED (LOCAL, MECHANICAL, SPECIAL) | PROTECTIVE GLOVES |
| Mechanical; to maintain vapors below the TDI TLV = 0.02pg | omImpervious rubber or |
| | 38 plastic. |
| | EYE PROTECTION Safety goggles |
| 36 | and face shield to avoid |
| RESPIRATORY PROTECTION (SPECIFY TYPE) | |
| | 39 splashing on face. OTHER PROTECTIVE EQUIPMENT |
| 77. 77.00 | |
| Use NIOSH approved breathing apparatus. | Respirator that provides |
| | 40 fresh air & splash apron. |
| SECTION VI HANDLING OF SPILES OF LAKS | |
| PROCEDURES FOR CLEAN-UP With adequate ventilation, cover with | an inert absorbent material |
| such as clay or vermiculite, transfer to a metal containe | r. Staurate with water but |
| DO NOT SEAL THE CONTAINER (CO2 will be generated). Wash | |
| 50% ammonia and detergent. Wear respirator and other pro | = |
| - protection of the sale with desire of the sale | |
| 41) protection of eyes and skin during cleanup. | |
| WASTE DISPOSAL | |
| | |
| 🗕 Dspose of consistent with Federal, State, and | local regulations. |
| 42] | |
| SECTION VII SPECIAL PRECAUTIONS | |
| PRECAUTIONS TO BE TAKEN IN HANDLING AND STORAGE | |
| Avoid contact with moisture. Isocyanates react wit | |
| which may rupture sealed containers. Store between | 40 & 80 °F (5 and 27°C). |
| 43 | |
| SECTION VIII TRANSPORTATION DATA | |
| U.S. D.O.T. PROPER SHIPPING NAME | |
| UNREGULATED V | ل ہر ئ |
| 44 BY D.O.T. 47 | % |
| REGULATED U.S. D.O.T. HAZARD CLASS | I.D. NUMBER |
| BY D.O.T 48 NA | |
| RQ LABEL(S) REQUIRED | 49 <i>NA</i> |
| TRANSPORTATION | i de la referencia de la composição de la c Porta de la composição de |
| EMERGENCY 50 51 NA INFORMATION | i Marija da Marija da La |
| FREIGHT CLASSIFICATION | |
| CHEM TREC 52 Liquid Plastic Material/NC | IBN |
| SPECIAL TRANSPORTATION NOTES | |
| 46 None | |
| | |
| SECTION IX COMMENTS | |
| NOTE: THE FOAM PRODUCED IS AN ORGANIC AND MUST BE CONSIDE | RED AS COMBUSTIBLE. |
| THE FOAM MUST NOT BE LEFT EXPOSED OR UNPROTECTED. | · · · · · · · · · · · · · · · · · · · |
| HEAT AND SPARKS WITH A THERMAL BARRIER. | |
| 54 SIMILARIO SITURIO WITH A THEOREM BARRIDA. | |
| | |
| | |
| (NVIII app. 1) | <u>, , , , , , , , , , , , , , , , , , , </u> |
| SIGNATURE Sales/Serv | ice/Supervisor |
| ι | |
| REVISION DATE SENT TO ATTN: | DATE |
| | |
| SUPERSEDES | VA) L |
| SUPERSEDES | |

We believe the statements, technical information and recommendations contained herein are reliable, but they are given without warranty or guarantee of any kind, express or implied, and we assume no responsibility for any loss, damage, or expense, direct or consequential, arising out of their use.



PRODUCT SR-0968A HAZARD RATING
N 4 - EXTREME
F 3 - HIGH
P 2 - MODERATE
1 - SLIGHT
0 - INSIGNIFICAN

| HONE | · | . Ш | 0 — INS | IGNIFICANT | Special |
|--|--|---------------------------------------|----------|--|--|
| Isocyanate Products Incorporated | | | | EMERGENCY TEI MANUFACTURFI 301: 392- | |
| ADDRESS (NUMBER, STREET, CITY, STATE, ZIP CODE) | | | | CHEM TREC 1 (8 | 00) 424-9300 |
| 2:505 Bive Ball Road Elkton, MD 21921 | Table | | | | |
| Reactive Isocyanates | FORI | mula I | Propr | eietary | |
| | ,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,, | | | | |
| SECTION IN CHEMICAL AND PHYSICAL PROPERTIES | CHEMICA | ð | | PHYSI | eau |
| HAZARDOUS DECOMPOSITION PRODUCTS | | · · · · · · · · · · · · · · · · · · · | FO | RM | |
| Oxides of carbon and nitrogen | | | 8 | Liquid | |
| 5 | | | 00 | OR S. | |
| INCOMPATIBILITY (KEEP AWAY FROM) | | _ | 9 | TDI Odo | r |
| Water(moisture), Alcohols, Amines, Stro | ong Acids and H | Bases | API | PEARANCE | year of the second seco |
| | | | 10 | Liquid | ting the state of |
| LIST ALL TOXIC AND HAZARDOUS INGREDIENTS | | | co | | <i>[</i> |
| Toluene Diisocyanate (TDI)/Polyether Pr | | | 11 | Orange - 1 | GITOM |
| 7 | Tsc | cyana | te se | ECIFIC GRAVITY (WATER = 1) | 1.1 @ 25°C |
| | | | '-1 | BOILING PT. | 101 |
| SECTION IN FIRE AND EXPLOSION DATA | , | | . | | 121 °c |
| SPECIAL FIRE FIGHTING PROCEDURES Firefighters must be | FLASH POINT (METHOD | USED) | 13 | | 250 ∘ F |
| equipped to prevent breathing of vapors or | C.O.C. | 30 | ! | MELTING PT. | |
| products of combustion. Must wear self- | FLAMMABLE LIMITS % | 8U_ °F | 11 | | NDA °C |
| contained breathing apparatus. | NDA | ٠. | 14 | | NDA •F |
| .24 | 27 LOWERUPPE | R | | SOLUBILITY | |
| USUAL FIRE AND EXPLOSION HAZARDS Avoid moisture | EXTINGUISHING AGENT | rs | 11 | IN WATER | |
| ontamination in closed containers. Reac- | X DRYCHEMICAL XIC | 002 | _ A | г°с | Reacts |
| ion with moisture will generate CO2 which | E WATERSPRAY EF | OAM | 15 | | |
| may rupture the container. | □ WATERFOG □SAND | D/EARTH | | % VOLATILE | 37.7 |
| 25 | 28 _ OTHER | | 16 | (BY WT %) | Nil |
| | | | . | EVAP. RATE | |
| SECTION IV HEALTH HAZARD DATA | | | . 177 | , -11 | NDA |
| PERMISSIBLE CONCENTRATIONS (AIR) | | 2 11 | | VAPOR PRESSURE | * |
| 0.02 ppm - 0.S.H.A. TLV for TDI | | | 18 | (mm Hg at 20 ℃) | |
| EFFECTS OF OVEREXPOSURE Trritant to eves & respi | ratory treet | Marr | 1 | VAPOR DENSITY | NDA |
| EFFECTS OF OVEREXPOSURE Irritant to eyes & respicause headaches, nausea, coughing, shortness chest discomfort. May result in respirate | ess of breath, | ·& | 19 | (AIR = 1) | INDA . |
| 30 chest discomfort. May result in respirat | tory distress. | | l I | pH AS IS | NDA |
| TOXICOLOGICAL PROPERTIES May cause allergic skin | or respiratory | у | 20 | рН (| NDA |
| reaction. Tersons with known respiratory | allergies sho | ula . | | | |
| avoid exposure to this product. | · · · · · · · · · · · · · · · · · · · | | | STRONG ACID | |
| In case of eye contact, flush with pl | lenty of water | for | | STRONG BASE | · |
| 32 EYES at least 15 minutes. Call a physicia | | | | STABLE | B |
| Wash thoroughly with soap and t | | | | UNSTABLE | |
| 33 SKIN CONTACT contaminated clothing & discard | | | 21 | | |
| shoes. Wash clothing before rea | | | | VISCOSITY | <100 🗇 |
| Remove from contaminated area | | | | SUS AT 100 °F | 100 OR > 🗆 |
| INHALATION - ORMENT. Call a physician. If v | | | 22 | | |
| -ing, give artificial respirat: | | | . 23 | | |
| mouth-to-mouth. If breathing is | difficult, give | ve | | | |

NA > NOT APPLICABLE

F SWALLOWED

NDA = NO DATA AVAILABLE

Call a physician immediately.

<= LESS THAN

>= MORETHAN

Viscosity @ 25°C

2000 cps



PRODUCT__SR-0968A

| | and the second s |
|---|--|
| SECTION V-SPECIAL PROTECTION INFORMATION | |
| VENTILATION TYPE REQUIRED (LOCAL, MECHANICAL, SPECIAL) | PROTECTIVE GLOVES |
| | Impervious rubber or |
| Mechanical; to maintain vapors below the TDI TLV = 0.02 | |
| | EYEPROTECTION Safety goggles |
| 36 | and face shield to avoid |
| RESPIRATORY PROTECTION (SPECIFY TYPE) | 39 splashing on face. |
| Use NIOSH approved breathing apparatus. | OTHER PROTECTIVE EQUIPMENT |
| approved brodoning apparabas. | Respirator that provides |
| | fresh air & splash apron. |
| | 40 |
| SECTION VI HANDLING OF SPILLS OF LEAKS | en e |
| PROCEDURES FOR CLEAN-UP With adequate ventilation, cover with | an inert absorbent material |
| such as clay or vermiculite, transfer to a metal contain | er Saturate with water but DO |
| NOT SEAL THE CONTAINER (CO2 will be generated). Wash the | |
| | |
| 50% ammonia and detergent. Wear respirator and other pro | receive eduthment for brotection |
| of eyes and skin during cleanup | |
| WASTEDISPOSAL | |
| | |
| Dispose of consistent with Federal, State, and loca | il regulations. |
| 42 | ************************************** |
| SECTION VILESPECAL PRECAUTIONS | |
| PRECAUTIONS TO BE TAKEN IN HANDLING AND STORAGE | the same of the sa |
| | |
| Avoid contact with moisture. Isocyanates react w | |
| which may rupture sealed containers. Store between 40 | and 80°F (5 and 27°C). |
| | |
| SECTION VIII — TRANSPORTATION DATA | |
| UNREGULATED X | |
| BY D.O.T. A | |
| U.S. D.O.T. HAZARD CLASS | I.D. NUMBER |
| REGULATED | |
| 45 | 49 NA |
| TRANSPORTATION- RQ LABEL(S) REQUIRED | |
| EMERGENCY 50 51 NA | |
| INFORMATION FREIGHT CLASSIFICATION | |
| CHEM TREC 52 Liquid Plastic Material/NOIBN | |
| SPECIAL TRANSPORTATION NOTES | 2 |
| 1-(830) 424-9300 None | |
| 53] | |
| SECTION IX COMMENTS | |
| NOTE: THE FOAM PRODUCED IS AN ORGANIC AND MUST BE CONS | TDERED AS COMPUSETTI RE |
| THE FOAM MUST NOT BE LEFT EXPOSED OR UNPROTECTED | |
| | the second secon |
| HEAT AND SPARKS WITH A THERMAL BARRIER. | |
| | |
| | |
| OAUL. | |
| SIGNATURE (MILMAN) | vice/Supervisor |
| SIGNATURE TITLE Sales/Ser | ATCE\Daher A 7201. |
| REVISION DATE 10/3/83 SENT TO ATTN: | DATE |
| MEN | |
| SUPERSEDES NEW | |
| | |
| | |

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| _ | | ···· |
|---|-------------------|----------|
| | HAZARD BATING | Fue A |
| N | 4 - EXTREME | Reactiv |
| | 3 - HIGH | |
| Ρ | 2 - MODERATE | < × > |
| Д | 1 - SLIGHT | Toxicity |
| | 0 - INSIGNIFICANT | Special |
| | | |

| PRODUCT CASTOMER E-600 | A | 1 - SL | IGHT Toxi | City Special |
|--|--|-----------------|-------------------------|--------------------------|
| SECTION I | | | | |
| WITCO MANUFACTURING DIVISION OR SUBSIDIARY | | 1 | EMERGENCY TE | LEPHONE |
| I. P. Inc. | | | MANUFACTURE 1301 392 | R 4800 |
| ADDRESS (NUMBER, STREET, CITY, STATE, ZIP CODE) | | - 1 | CHEM TREC 1-18 | 1001424-9300 |
| 2 505 Blue Ball Road, Elkton, Maryland | | | <u> </u> | |
| GHEMICAL NAME OR FAMILY 3 Foluene Diisocyanate (TDI) Prepolymer | FORMULA 4 | | rietary | |
| SECTION II CHEMICAL AND PHYSICAL PROPERTIES - | CHEMICAL | | -PHYS | ICAL |
| HAZARDOUS DECOMPOSITION PRODUCTS | | FO | RM . | |
| | | 8 | liquid | |
| 5 Oxides of Carbon and Nitrogen INCOMPATIBILITY (KEEPAWAY FROM) | ., ., | OD | oa Sharp Pung | ent |
| | • | . 9 | TDT Odor . | ello |
| Water (moisture), Alcohols, Amines, Str | rong Acids and Bas | _ z | Liquid | |
| LIST ALL TOXIC AND HAZARDOUS INGREDIENTS | | ได้ก็ | LOR | |
| Toluene Diisocyanate (TDI) and Toluene 1 | Diisocyanate (TDI) | 31 | Clear Amber | • |
| Prepolymers | | SP | ECIFIC GRAVITY | 1.05 @ 25 ⁰ C |
| L'IL | · | 12 | | 1.03 e 23 C |
| SECTION TIL - FIRE AND EXPLOSION DATA | ? . | İ | BOILING PT. | > 204 •c |
| SPECIAL FIRE FIGHTING PROCEDURES Firefighters must be | FLASH POINT (METHOD USED | <u> </u> | | |
| equipped to prevent breathing of vapors | 1 / () / (| 13 | | >400 °E |
| or products of combustion. Must wear | 26 204 °C 400 | °F. | MELTING PT. | . NDA °c |
| selfcontained breathing apparatus. | FLAMMABLE LIMITS % | | r to the | NDA •F |
| 24 | NDA ND | Δ 14 | | |
| UNUSUAL FIRE AND EXPLOSION HAZARDS Avoid moisture | 27 LOWER NDA UPPER ND. EXTINGUISHING AGENTS | | SOLUBILITY IN WATER | • |
| contamination in closed containers. Reac- | D DRYCHEMICAL X CO. | A | TNA°C | Reacts |
| tion with moisture will generate CO2 which | M WATERSPRAY X FOAM | 15 | - | |
| may rupture the container. | WATERFOG SANDEAR | гн] | % VOLATILE (BY WT %) | MD |
| 25 | 28 FI OTHER | 16 | EVAP. RATE | NDA |
| | 4 | _ | EVAF. HATE | |
| SECTION TV - HEALTH-HAZARD-DATA | | 17 | (Water=1) | NDA |
| PERMISSIBLE CONCENTRATIONS (AIR) | | | VAPOR PRESSURE | |
| 0.02 ppm - O.S.H.A. TLV for TDI | • | 18 | (mm Hg at 20°C) | ₹ 0.011 |
| EFFECTS OF OVEREXPOSURE Irritant to eves & respir | atory tract. May | 19 | VAPOR DENSITY | NDA |
| -ause headaches, nausea, coughings, shortne | ess of breath. & | | -U AC 10 | NDA |
| TOYICOLOGICAL PROPERTIES | OLY UIS OF COM | $\dashv \vdash$ | ZIZA HQ K X X I Hq | NDA , |
| reaction. Persons with known respiratory a | or respiratory | 20 | PITAAA | NDA v |
| 31 avoid exposure to this product. | irrengies should | - | STRONG ACID | D |
| EMERGENCY FIRST AID PROCEDURES | · · · | 71 | STRONG BASE | |
| In case of eye contact, flush with pl | enty of water for | 5 1 | STABLE | |
| 32 EYES at least 15 minutes. Call a physician | | | UNSTABLE | XX |
| Wash thoroughly with soap and | | 21 | | |
| 33 SKIN CONTACT contaminated clothing & discar | | | VISCOSITY | |
| shoes. Wash clothing before r | | _ | SUS | |
| Remove from contaminated area | | 1 1 - 1 | AT 100 °F | 4 |
| 34 INHALATION onment. Call a physician. If v | | | | NDA: |
| _ing, give artificial respirati | | 23 | e die Green ge | |
| mouth-to-mouth. If breathing i oxygen. | s difficult, give | | | n |
| Call a physician immediately | | - Lv | iscosity 0 | 25 C |
| Cert a bulgarated ammediateath | | | | |
| | | _ | 1,350 cps | |
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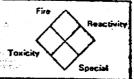
PRODUCT CASTOMER E-600A

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| SECTION V - SPECIA | L-PROTECTION | HNFORMATION | | PROTECTIVE GLOVES | |
| VENTILATION TYPE REQU | RED ILOCAL, MEC | HANICAL, SPECIALI | | Impervious r | uhhan an |
| Mechanical t | o maintain | vapors below the TDI TLV =0 | mag 20.0 | Impervious r | upper or |
| nechanical, | O mariioarii | | • • | 3# DIASCIC | |
| | 24. | The second secon | | EYEPROTECTION Safe | |
| 36 | | 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 | | and face shield | to avoid |
| RESPIRATORY PROTECTIO | N ISPECIFY TYPE | | | 39 splashing on | face. |
| | | | | OTHER PROTECTIVE EQUIP | |
| Use NIOSH app | roved breat | thing apparatus. | 1.5 | Respirator that | - |
| y yananina na ee see | | | The state of the s | fresh air & sp | lash apron. |
| 37 | | | | 1401 | <i>-i</i> |
| SECTION VI - HANDL | ING DESPITS | ORLEAKS | • | | and the second |
| PROCEDURES FOR CLEAN | UP With ad | equate ventilation, cover wi | ith an i | nert absorbent m | aterial |
| such as clay NOT SEAL THE 5% ammonia a | or vermicu CONTAINER nd deterge | lite, transfer to a metal co (CO will be generated). Wash nt. Wear respirator and oth skin during cleanup. | ontainer n the ar | Saturate with ea with water co | water but DO ntaining |
| WASTE DISPOSAL | | | | | and the second |
| WASTEDISTUSAL | the fitting | | | | |
| | | t with Rodonal State and le | ocal reg | mlations | |
| Dispose OI | consisten | t with Federal, State and lo | ocar res | CATAOTOND & CASE OF | |
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| SECTION VII — SPECIA | | | · · · · · · · · · · · · · · · · · · · | | 2.4.5 |
| PRECAUTIONS TO BE TAK | | | • • • | | 700 |
| Avoid cont | act with m | oisture. Isocyanates react | with wa | ter and generate | CO which |
| may ruptur | e sealed c | ontainers. Store between 40 | and 80 | $F (5 \text{ and } 27^{\circ}C)_{\bullet}$ | - |
| 43 | ······································ | | | • | |
| SECTI ON VIII → TRAN | SPORTATIONA | MATA | V | *, ** | |
| | | PROPER SHIPPING NAME | | | and the same |
| UNREGULATED | 71 | | | 이 그는 그를 맞는다. 아 | 1. 5. 4.4 |
| BY D.O.T. | 47 | NA - | | | |
| REGULATED | U.S. D.O.T. | HAZARD CLASS | | | I.D. NUMBER |
| BY D.O.T | 48 | NA | | The second section of the section of the second section of the section of the second section of the s | 49 NA |
| 45 | | LABEL(S) REQUIRED | | and the second | |
| TRANSPORTATION | RO | | | and the second of the second | A Mark at more and |
| EMERGENCY | 50 | 51 NA | 32.973 | | |
| INFORMATION | FREIGHT CL | ASSIFICATION | 164 | | |
| S CUENTOCO | 52 Li | quid Plastic Material/NOIBN | The second secon | င်း ကြိုင်းသည်။ သည် သည် မြော်သည်။ ကြိုင်းသည်။ သည် သည် သည်။ ကြိုင်းသည်။ သည် | क्रि <mark>कें के क</mark> ्रिकेट कर कर के दिन |
| CHEM TREC | SPECIAL TRA | ANSPORTATION NOTES | • | | |
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| 16 | 53 NO | ne | | | |
| SEGTION IX - COMM | NES- | | | | |
| | | | | | <u></u> |
| NOTE: THE FOA | M PRODUCED | IS AN ORGANIC AND MUST BE | CONSIDE | RED AS COMBUSTIBI | |
| THE FOAM MUST | NOT BE LEF | T EXPOSED OR UNPROTECTED. | SHIELD 7 | THE FOAM FROM 🔣 | |
| THEAT AND SPARK | T A HTTW 2 | HERMAL BARRIER. | | | |
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We believe the statements, technical information and recommendations contained herein are reliable, but they are given without warranty or guarantee of any kind, express or implied, and we assume no responsibility for any loss, damage, or expense, direct or consequential, arising out of their use.

PRODUCT E-0852A





IPI

Isofoam® Systems

Triumph Industrial Park, 505 Blue Ball Road P.O. Box 70, Elkton, MD 21921 (301/392-4800)

EMERGENCY TELEPHONE
MANUFACTURFR
13.0.1.) 392-4800
CHEM TREC 1-(800) 424-9300

CHEMICAL NAME OR FAMILY

3 Reactive Isocyanates

4 Proprietary

| SECTION IL-SCHEMICAL AND PHYSICAL PROPERTIES | [CHEMICAL] | PHYS | ICAN |
|---|--|---------------------|-----------------------|
| HAZARDOUS DECOMPOSITION PRODUCTS | | FORM | • |
| Oxides of carbon and nitrogen | | Liquid | |
| 5 | | | |
| INCOMPATIBILITY (KEEP AWAY FROM) | | ODOR Sharp I | Pungent |
| Water(moisture), Alcohols, Amines, Str | one Acids and Bases | 9 TDI Odo | or |
| 6 | The state will be be a second | APPEARANCE | |
| LIST ALL TOXIC AND HAZARDOUS INGREDIENTS | • | -10 Liquid | |
| Toluene Diisocyanate (TDI)/Polyether P | | COLOR DEPLIES | |
| Free Isocyanate | reportamer. | 11 | |
| 7 | | SPECIFIC GRAVITY | .02 [@] 25°C |
| | | | -UZ |
| SECTION IN FIRE AND EXPLOSION DATA | | BOILING PT. | > 149 • c |
| | ELASH POINT (METHODUSED) | | |
| SPECIAL FIRE FIGHTING PROCEDURES Firefighters must be | C.O.C. | 13 | <u> > 300 °F</u> |
| equipped to prevent breathing of vapors or | 26 7121 °C 2250 °F | MELTING PT. | NIDA |
| products of combustion. Must wear self- | FLAMMABLE LIMITS % | | NDA •c |
| contained breathing apparatus. | | 14 | NDA of |
| 24 | 27 LOWER NDAUPPERNDA | SOLUBILITY | |
| UNUSUAL FIRE AND EXPLOSION HAZARDS Avoid moisture | EXTINGUISHING AGENTS | IN WATER | |
| ntamination in closed containers. Reac- | - X DRYCHEMICAL X CO. | AT_NA _°C | Reacts == |
| ion with moisture will generate CO2 which | ™ WATERSPRAY % FOAM | 15 | |
| may rupture the container. | 1 | % VOLATILE | |
| 25 | WATERFOG DSAND/EARTH | 16 (BY WT %) | NDA |
| (23) | 28 _ OTHER | EVAP, RATE | |
| | | | |
| SECTION IV HEALTH HAZARD DATA PERMISSIBLE CONCENTRATIONS (AIR) | | 17 (Water = 1) | NDA |
| CHMISSIDEE CONCERTANTIONS (AIM) | | VAPOR PRESSURE | |
| 0.02 ppm - O.S.H.A. TLV for TDI | | 18 (mm Hg at 20 °C) | 40.011 |
| | | VAPOR DENSITY | |
| EFFECTS OF OVEREXPOSURE Irritant to eyes & respicause headaches, nausea, coughing, shortn chest discomfort. May result in respira | eratory tract. May | 19 (AIR = 1) | NDA |
| chest discomfort. May result in respira | tory distress. | 1 1 1 1 1 1 1 | NDA |
| | | pH AS IS | NDA |
| TOXICOLOGICAL PROPERTIES May cause allergic skin reaction. Persons with known respiratory | or respiratory | 20 pH (XXX.) | - NDA |
| avoid exposure to this product. | 4110.9100 0 | | |
| EMERGENCY FIRST AID PROCEDURES | | STRONG ACID | |
| In case of eye contact, flush with p | lenty of water for | STRONG BASE | |
| 32 EYES at least 15 minutes. Call a physici | an. | STABLE | XX |
| Wash thoroughly with soap and | water. Remove | UNSTABLE | |
| | | 21 | |
| 33] SKIN CONTACT COntaminated Clothing & discar shoes. Wash clothing before re | | VISCOSITY | |
| Remove.from contaminated area | | SUS | |
| NHALATION ONMENT. Call a physician. If v | | AT 100°F | NDA |
| -ing, give artificial respirat | | | ** = |
| mouth-to-mouth. If breathing is | | 23 | |
| 35 FSWALLOWED HOUGH-CO-HOUGH, II Dreaching IS | A STATE OF THE PARTY OF THE PAR | | -CO- |
| Call a physician immediately. | oxygen. | Viscosity @ 2 | 57C - 🖘 |
| | | | |
| | | 450 cps | |

NA = NOT APPLICABLE

NDA = NO DATA AVAILABLE

<= LESS THAN

>=MORE THAN

PRODUCT_E-0852A

| SECTION V - SPECIAL F | ROTECTIONINFORMA | FION | | |
|----------------------------|--|--|--|---------------|
| VENTILATION TYPE REQUIRE | LOCAL, MECHANICAL, SPE | CIALI | PROTECTIVE GLOVES | |
| Mechanical; to ma | intain vapors be | low the TDI TLV = 0.02 ppm | Impervious r | ubber or |
| - | • | | EYE PROTECTION Safe | ty goggles |
| RESPIRATORY PROTECTION (S | OCCUENT THE | | and face shie | ld to avoid |
| 4 | | | 39 splashing on | face. |
| ose ntosh app | proved breathing | apparatus. | OTHER PROTECTIVE EQUIPMENT CONTROL TO THE PROTECTIVE EQUIPMENT CON | provides |
| 37 | | | fresh air & s | plash apron. |
| SECTION VI HANDLING | SOESPILES OF LEAKS | | | |
| PROCEDURES FOR CLEAN-UP | With adequate ve | ntilation, cover with an | inert absorbent | material |
| lacer as cray of A | ruitculle, trans | IEC TO a metal container | Saturnata with | |
| INOT DOVE THE COMP | TINER (COS MILL D | e generated). Wash the and | as with water | |
| TOO STITUTE STATE OF | cergent. wear re | Spirator and other protect | tive equipment f | or protection |
| 41 of eyes and sk | in during cleanup | and the second s | | |
| WASTEDISPOSAL | | Service of the servic | | |
| Dispose of o | Omeigtent with Pe | | | |
| 42 | onsistent with te | ederal, State, and local r | egulations. | |
| SECTION VIEWS PECIAL P | RECAUTIONS | | | |
| PRECAUTIONS TO BE TAKEN IN | HANDLING AND STORAGE | | | |
| Avoid con | tact with moistur | e. Isocyanates react with | | |
| which may rupt | ire sealed contai | ners. Store between 40 and | water and gener | ate CO2 |
| | · · · · · · · · · · · · · · · · · · · | icis. Store between 40 and | 1 80°F (5 and 27 | °C). |
| SECTION VIII TRANSPO | RITATION DATA | | | |
| UNREGULATED [V] | U.S. D.O.T. PROPER SHIPPIN | GNAME | | |
| UNREGULATED X | | A | | · 图 建缩处型 |
| REGULATED BY D.O.T | U.S. D.O.T. HAZARD CLASS | | | I.D. NUMBER |
| 45 81 0.0.1 | 48 | | • | 49 NA |
| TRANSPORTATION | RQ LABEL(S) RE | | | |
| EMERGENCY INFORMATION | 50 51 N | <u>A</u> | | |
| | FREIGHT CLASSIFICATION | • | | |
| CHEM TREC | 52 Liquid Plast | ic Material/NOIBN | | |
| 1-(300) 424-9300 | SPECIAL TRANSPORTATION | NOTES | • • • | |
| 46 | None . | • | | |
| ECTIONIX COMMENTS | | | | |
| NOTE: THE FOAM P | RODUCED IS AN ORG | GANIC AND MUST BE CONSIDER | TED AC COMPUTATION | |
| THE FOAM M | UST NOT BE LEFT | EXPOSED OR UNPROTECTED. S | ED AS COMBUSTIL | BE. |
| HEAT AND S | PARKS WITH A THE | RMAI BARRIER | utern lue komm | r RUM |
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| week, the | | was a second of the second of | | |
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| SIGNATURE | MANUAL | ever to | | |
| | 1 -1 -1 | TITLE <u>Sales Service</u> | Supervisor | |
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We believe the statements, technical information and recommendations contained herein are reliable, but they are given without warranty or guarantee of any kind, express or implied, and we assume no responsibility for any loss, damage, or expense, direct or consequential, arising out of their use.

MATERIAL SAFETY DATA SHEET HAZARD RATING 4 - EXTREME Reactivity 3 - HIGH PRODUCT CASTOMER E-0866A 2 - MODERATE 1 - SLIGHT 0 - INSIGNIFICANT Special SECTION MANUFACTURING DIVISION OR SUBSIDIARY EMERGENCY TELEPHONE IPI ** * ** MANUFACTURER 1301 1 392-4800 CHEM TREC 1 (800) 424-9300 ADDRESS INUMBER, STREET, CITY, STATE, ZIP CODE 505 Blue Ball Road, Elkton, Maryland FORMULA CHEMICAL NAME OR FAMILY Proprietary Toluene Diisocyanate (TDI) Prepolymer · CHEMICAL -PHYSICAL SECTION II: CHEMICAL AND PHYSICAL PROPERTIES FORM HAZARDOUS DECOMPOSITION PRODUCTS a liquid ODOR Sharp Pungent Oxides of Carbon and Nitrogen INCOMPATIBILITY IKEEP AWAY FROM) 9 TDT Odor Water (moisture), Alcohols, Amines, Strong Acids and Bases 6 10 Liquid LIST ALL TOXIC AND HAZARDOUS INGREDIENTS COLOR Toluene Diisocyanate (TDI) and Toluene Diisocyanate (TDI) Clear Liquid 1.07@ 25°C Prepolymers 12 (WATER = 1) BOKING PT. SECTION III - FIRE AND EXPLOSION DATA >177 SPECIAL FIRE FIGHTING PROCEDURES Firefighters must be FLASH POINT (METHOD USED) > 350 C.O.C. equipped to prevent breathing of vapors MELTING PT. 152_*c_305 'or products of combustion.Must wear NDA FLAMMABLE LIMITS % NDA selfcontained breathing apparatus. 27 LOWER NDA UPPER NDA SOLUBILITY UNUSUAL FIRE AND EXPLOSION HAZARDS Avoid moisture contamination in closed containers. Reac-EXTINGUISHING AGENTS IN WATER D DRYCHEMICAL XI CO. AT NA React 15 tion with moisture will generate CO2 which WATERSPRAY X FOAM % VOLATILE may rupture the container. MATERFOG DSAND/EARTH (BY WT %) NDA 28 C) OTHER EVAP, RATE SECTION IV - HEALTH HAZARD DATA 17 (Water VAPOR PRESSURE 0.011 18 (mm Hg at 20°C) VAPOR DENSITY NDA

| PERMISSIBLE CONCEN | TRATIONS (AIR) |
|---------------------|---|
| 0.02 ppm | - O.S.H.A. 'TLV for TDI |
| EFFECTS OF OVEREXP | irritant to eyes a respiratory tract. Hay |
| -cause headach | nes, nausea, coughing, shortness of breath, & omfort. May result in respiratory distress. |
| TOXICOLOGICAL PROI | PERTIES May cause allergic skin or respiratory |
| -reaction re | ersons with known respiratory allergies should ure to this product. |
| EMERGENCY FIRST ALL | DEROCEDURES |
| In case at leas | e of eye contact, flush with plenty of water for the st 15 minutes. Call a physician. |
| | Wash thoroughly with soap and water. Remove |
| 33 SKIN CONTACT | contaminated clothing & discard contaminated |
| 33 SKIN CUNTACT | shoes. Wash clothing before reuse. |
| | Remove from contaminated area to fresh air envir- |
| 34 INHALATION | onment. Call a physician. If victim is not breath |
| | ing, give artificial respiration, preferably |
| | mouth-to-mouth. If breathing is difficult, give |
| IF SWALLOWED | oxygen. |
| ! | Call a physician immediately |

°C $\{AIR = 1\}$ NDA pH AS IS NDA: K X X 1Hq STRONG ACID STRONG BASE STABLE. UNSTABLE VISCOSITY sus AT 100 °F

NA = NOT APPLICABLE

NDA = NO DATA AVAILABLE

<= LESS THAN

Viscosity 0 .000 cps

>=MORE THAN

1.4



PRODUCT CASTOMER E-0866A

| TO THE PROPERTY OF THE PROPERT | |
|--|--|
| SECTION V - SPECIAL PROTECTION INFORMATION | PROTECTIVE GLOVES |
| VETHILATION TYPE REQUIRED ILOCAL MECHANICAL, SPECIALI | Impervious rubber or |
| Mechanical; to maintain vapors below the TDI TLV =0.0 | 2 ppm - plactic |
| Mechanical, 60 maintain vapor 2 - 2 - 2 | TYPE PROTECTION CO-Co-to- marging |
| | EYEPROTECTION Safety goggles |
| | and face shield to avoid |
| RESPIRATORY PROTECTION (SPECIFY TYPE) | 39 splashing on face. |
| RESPIRATORY PROTECTION OF ECTIVATION OF THE PROTECTION OF THE PROT | OTHER PROTECTIVE EQUIPMENT |
| Use NIOSH approved breathing apparatus. | Respirator that provides |
| OSE MIODU Apploace processing applications | fresh air & splash apron- |
| 97] (2.10元) - 10.45克) (1.10元) - 10.10元) - 10.10元(1.10元) | [40] |
| | |
| SECTION VI - HANDLING OF SPILES OR LEAKS | |
| PROCEDURES FOR CLEAN-UP With adequate ventilation, cover with | an inert absorbent material |
|) | 'S HELL THE COLUMN AND MAKEN |
| | |
| NOT SEAL THE CONTAINER (CO WITT be generated). Wash to 5% ammonia and detergent. Wear respirator and other | protective equipment for |
| 5% ammonia and detergent. Wear respirator and other | |
| protection of eyes and skin during cleanup. | |
| 41 7 | |
| WASTE DISPOSAL | |
| 1 n n 1 -2 mate 1 2000 | ol memulations |
| Dispose of consistent with Federal, State and loca | II Legurations. |
| 12 | |
| SECTION VII - SPECIAL PRECAUTIONS | |
| TORGETT TOUGH TO BE TAYEN IN HANDLING AND STORAGE | |
| Tsocyanates react Wi | ith water and generate CO which |
| may rupture sealed containers. Store between 40 ar | od 80 F (5 and 27 C) |
| may rupture sealed containers. Store between 40 at | IId 50 1 (5 dile 2) 57. |
| 43 | Manual Control of the |
| SECTION VIII - TRANSPORTATION DATA | |
| U.S. D.O.T. PROPER SHIPPING NAME | |
| UNREGULATED Y | |
| BÝ D.O.T. 47 | A Company of the Comp |
| U.S. D.O.T. HAZARD CLASS | I.D. NUMBER |
| REGULATED TO REGULATED | 49 NA |
| 45 8Y D.O.T 48 NA | A A A PROPERTY OF THE PARTY OF |
| RO LABEL(S) REQUIRED | |
| TRANSPORTATION 50 51 NA | |
| | CONTRACTOR OF THE STATE OF THE |
| Lucioni Crypping | The second secon |
| CHEMITHEC 52 Liquid Plastic Material/NOIBN | The second of th |
| SPECIAL TRANSPORTATION NOTES | |
| 1-(800) 424-9300 · | |
| 16 SJ None | |
| OF TON IN COMMENTS. | |
| SEGTION IX COMMENTS | The state of the s |
| NOTE: THE FOAM PRODUCED IS AN ORGANIC AND MUST BE CO | INSIDERED AS COMBUSTIBLE |
| THE FOAM MUST NOT BE LEFT EXPOSED OR UNPROTECTED. SH | ITELD THE FOAM FROM |
| THE FOAM MUST NOT BE LEFT EXPOSED ON UNINOTECTED. | |
| HEAT AND SPARKS WITH A THERMAL BARRIER. | A Company of the Comp |
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| · Partie of the second of the | entra entra de orbitale de la companya de la compa |
| Calor C | Service Supervisor |
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CONTINUATION SHEET Page 3

Attachments for 4.03:

- 1. Typical product drum label
- 2. Polyisocyanate Safetly Information Attached to each "A" container.
- 3. SPI Bulletin 118-R
- 4. SPI Bulletin U-11

ISOFOAM®



POLYISOCYANATE COMPONENT

CONTAINS: TOLUENE DIISOCYANATE PREPOLYMER

A/B RATIO,

BY WEIGHT

Danger! Causes burns. Harmful if inhaled. May cause allergic skin or respiratory reaction. Persons with known respiratory allergies should avoid exposure to this product.

Contains Reactive Isocyanate Groups. Do not get in eyes or on skin or clothing. Wear chemical splash goggles and rubber gloves. Use with adequate ventilation. Do not breathe vapor. Use a NIOSH approved respirator. Keep container closed. Wash thoroughly after handling.

First Aid: If inhaled, swallowed or in the event of eye contact, call a physician immediately. Flush skin and eyes with large amounts of water for at least 15 minutes. Remove contaminated clothing and discard contaminated shoes. Wash clothing before reuse.

If inhaled, remove to fresh air. If not breathing, give artificial respiration, preferably mouth to mouth. If breathing is difficult, give oxygen. Call a physician.

Important
The foam produced is an organic material. It must be considered as combustible and may constitute a fire hazard. The foam must not be left exposed or unprotected. Shield the foam from heat and sparks by a thermal barrier.

In case of fire, use water spray, foam, dry chemical or CO₂. Wear positive pressure, self-contained breathing apparatus.

In case of spill or leak, evacuate and ventilate spill area. Cover with inert absorbent material such as sand, earth, or vermiculite. Transfer to waste container. Saturate with water. Do not seal container. Flush residue with water. Wear respiratory and other protective equipment during clean-up. Dispose of consistent with federal, state and local regulations.

Store in a dry place at temperatures of 60-85°F.

For Industrial Use Only. Do Not Swallow. Ask for technical data bulletin and material safety data sheet on this product prior to use. Read the attached safety and handling information for further details. Do not reuse empty drums or pails; decontaminate and puncture or crush.

No warranties, expressed or implied, including patent warranties or warranties of merchantability or fitness for use, are made with respect to this product.



Triumph Industrial Park 505 Blue Ball Road P.O. Box 70 Elkton, MD 21921 may be extinguished with carbon dioxide, dry chemical, or an inert gas. Application of large quantities of water spray is recommended for spill fires. Fire fighters should be equipped with NIOSH approved self-contained breathing apparatus.

STORAGE

Polyisocyanate materials are ideally stored between 60°F and 85°F, away from direct sunlight, and in sealed containers or adequately designed bulk storage tanks. Do not leave containers open.

APPLICATION OR USE PRECAUTIONS

The polyurethane foams produced from polyisocyanates present significant fire risks in certain applications. Once ignited, these foams can burn rapidly and produce intense heat, dense smoke and irritating or toxic gases. All interior building insulation applications of polyurethane foam should be protected from accidental ignition with an appropriate barrier. Wall and ceiling applications should not be considered unless a fire resistive thermal barrier is included having a 15 minute finish rating.

Welding, cutting and other hot work should not be done in areas where polyurethane foam is not protected.

Application equipment must be properly maintained and calibrated to avoid producing off-ratio foam.

Large quantities of foam should not be accumulated in a manner that could retain exothermic heat and possibly result in autoignition. This includes calibration or test shots and scrap foam.

Do not smoke or use naked lights, open flames, space heaters, or other ignition sources near pouring, frothing or spraying operations.

Persons who will work with polyisocyanates should undergo screening physical examinations before initially starting such work in order to eliminate hypersensitive individuals and those who have a history of chronic respiratory illness or allergic response.

Periodically, workers should be rechecked for systemic effects of polyisocyanate exposure. Workers developing asthmatic reaction or other sensitization should be removed from further exposure.

SPECIAL EMPHASIS FOR SPRAY APPLICATIONS

Workers engaged in spraying polyisocyanates must wear positive pressure air-supplied face masks or hoods.

Inspect the application area from the potential to expose other persons or for overspray to drift onto buildings, vehicles or other property. When spraying building exteriors, persons entering or exiting the building as well as those inside could be exposed to polyisocyanates due to wind conditions, open windows or air intakes. Do not begin application work until these potential problems have been corrected.

When spraying building interiors, the foam must not be left as an exposed interior finish on walls or ceilings or in any horizontal or vertical flue-like configuration.

Obtain and read the product data bulletin and material safety data sheet prior to using this material.

If you need additional information contact your IPI representative or call: 301-392-4800.

In case of chemical emergency after hours contact Chemtrec at 800-424-9300.

IPI 505 Blue Ball Rd. P.O. Box 70 Elkton, MD 21921 301-392-4800 IMPORTANT INFORMATION
IMPORTANT INFORMATION
HANDLING INFORMATION
HANDLING INFORMATION
HANDLING INFORMATION
WORKING WITH THIS MATERIAL
WORKING WITH THIS MATERIAL

ISOFOAM POLYISOCYANATES

HANDLING AND SAFETY INFORMATION

Misuse of this material can be hazardous! Read this literature — safety is your responsibility.

PRIMARY PRECAUTIONS:

- AVOID BREATHING POLYISOCYANATE VAPORS
- AVOID SKIN & EYE CONTACT WITH POLYISOCYANATES
- AVOID EATING POLYISOCYANATES
- AVOID FLAME SOURCES AROUND POLYISOCYANATES
- PROTECT POLYISOCYANATES FROM WATER, MOISTURE, AND OTHER REACTANTS

VAPORS, MISTS AND DUST

Polyisocyanates will irritate the nose, throat, lungs and eyes. Symptoms may include watering of the eyes, dryness of the throat, tightness of the chest, headaches, nausea, coughing, and shortness of breath. Some persons can become sensitized to polyisocyanates and suffer asthma-like attacks and respiratory distress when exposed to low concentrations. Persons with known respiratory allergies should avoid exposure to polyisocyanates.

Proper handling, mechanical ventilation and air supplied respirators can be used to avoid exposure to polyisocyanate vapors, mists and dust.

LIQUIDS

Liquid polyisocyanates can cause severe eye irritation, inflammation, and/or damage to sensitive eye tissue.

Skin contact can cause reddening, irritation, dermatitus, and, in some individuals, sensitization.

Ingestion can cause irritation and damage to mouth, throat, and stomach tissue.

Proper handling, wearing chemical goggles or a face shield, rubber aprons, gloves, and coveralls should be used to avoid contact with liquid polyisocyanates.

REACTIVITY

Polyisocyanates are highly reactive chemicals and should be handled and stored in a way to avoid

exposure to many common substances including water and moisture.

FIRST AID

Inhalation — remove persons with exposure symptoms from contaminated area immediately. If breathing is labored or difficult, trained personnel should administer oxygen.

Skin contact — wipe off excess. Flush with water. Wipe with rubbing alcohol and wash with soap and water. Wash clothing before reuse.

Eye contact — flush immediately with clean water for 15 minutes. Obtain medical attention.

Ingestion — drink milk and contact a physician. Vomiting can induce a risk of inhaling polyisocyanate liquids or vapors.

SPILLS

Protect personnel from polyisocyanate vapors and liquids. Dike the spill and collect by appropriate methods for the quantity.

NOTE: Do not seal containers of collected polyisocyanates if moisture contamination was possible. Carbon dioxide generation and ruptured containers could result.

Neutralize the residue with a dilute aqueous ammonia detergent solution (90 parts water, 8 parts Ammonium Hydroxide, 2 parts liquid detergent).

DISPOSAL

Waste polyisocyanates can be disposed of through licensed disposal agencies or by conversion to solid polyurethanes with proper care. In all cases, Local, State and Federal regulations should be followed.

Empty drums and pails should be decontaminated and punctured to prevent reuse.

FIRE HAZARDS

Although the flash points are high enough that ISOFOAM polyisocyanates are not considered serious fire risks, these materials will burn if subjected to sufficient heat in the presence of oxygen. Fires

TECHNICAL BULLETIN

118-R May 1988

Guide for the Safe Handling and Use of Polyurethane and Polyisocyanurate Foam Systems

INTRODUCTION

Polyurethane and polyisocyanurate foam systems consist of several different chemical compounds, some of which may be hazardous to your health and safety if incorrectly used. Since essentially the same chemicals are used in both polyurethane and polyisocyanurate foam systems, the discussions pertaining to polyurethanes in this Guide also will apply to polyisocyanurates.

While many millions of pounds of polyurethane foam systems are processed or applied every year without adverse incident, some cases of personal injury have resulted from improper use or handling of these materials. The purpose of this Guide is to warn

and inform the users of these systems of potential health risks that may be encountered and to emphasize the precautions that must be taken in order to minimize the possibility of accidents or injuries.

This Guide has been developed to provide information regarding the handling and use of polyure-thane foam systems. Ultimately, however, responsibility of insuring that those who actually work with or apply polyurethane foam systems rests with the supervisors of the companies, contractors and applicators installing polyurethane foam systems. This Guide, then, is intended to assist in understanding potential risks so that they can be avoided.

CHEMICAL COMPOSITION OF POLYURETHANE FOAM SYSTEMS

Polyurethane foam systems generally are composed of two reactive mixtures — an isocyanate "side" (A Component) and a blended polyol resin "side" (B Component) supplied either as drum sets, or in bulk to large-volume users with tankage facilities. In use, the two "sides" are metered in the proper ratio of A and B through proportioning pumps to a mixing head or spray gun, where they are intimately mixed, and the mixture is dispensed to produce a finished foam. Although now relatively rare, some foam systems may include a third liquid component, usu-

ally a catalyst blend which, for any of several reasons, is packaged to be fed as a third stream at the applications site. The generic chemical compositions of polyurethane foam systems are listed in Table 1 with the indicated potential hazards.

Solvents are used in cleanup operations and in flushing polyurethane foam dispensing equipment. These solvents may be toxic, flammable or irritants, and the solvent supplier should be consulted regarding the safe handling of any solvents used.

| | | TABLE 1 | | Potential Sensitizer |
|---|----------------|---------------------------------------|-------------------|-------------------------|
| | Component | Chemical Composition | Skin Irritant¹ | (Respiratory or Skin) |
| A | Isocyanate | Monomeric, polymeric or prepolymer | Yes | Yes |
| В | Resin Blend | Polyol resin | No | No |
| | | Amines and/or Metallic Salt Catalysts | Yes | Yes (some) |
| | | Chlorofluorocarbon Blowing Agents | No | No |
| | | Silicone Surfactants | No | No |
| С | Catalyst Blend | Amines | Yes | Yes (some) |
| | - | Water | No | No |

RISKS AND PRECUATIONS

Although the greatest health risk in the use of polyurethane foam systems arises from inhalation of isocyanate vapors or mist, each component, as indicated in Table 1, contains at least one chemical ingredient that can present a potential health risk. The risk is increased when the components are mixed and dispensed. The heat generated by the reacting mixture can vaporize monomeric isocyanates and amines. In spray foam operations, a fine particulate mist of the reacting ingredients also is formed. Both vapor and mist can present a potential risk to the respiratory tract and the eyes.

All personnel who will be working with isocyanates should have pre-employment and periodic medical examinations, including pulmonary function testing. Those with a medical history of chronic respiratory ailments, asthmatic or bronchial attacks, or indications of allergic responses should not handle, use or be around isocyanates. Workers who develop respiratory distress (shortness of breath, chest pain, difficulty in breathing) should be removed from further exposure immediately and examined by a physician.

VENTILATION AND RESPIRATORY PROTECTION

Mechanical ventilation, adequate to draw vapors or aerosols away from the operator's breathing zone, must be provided at work stations and wherever polyurethane chemicals, particularly the isocyanates, are exposed to the atmosphere. In general, inhalation of isocyanate vapor presents a significant health risk in polyurethane pouring or frothing operations, and must be avoided.

While several types of isocyanates are used in making polyurethanes, the three most common are toluene diisocyanate (TDI), used principally in flexible foams; diphenylmethane diisocyanate (MDI), used in making elastoplastics; and polymeric isocyanates (PMDI), used almost exclusively in rigid foam systems. Although polymeric isocyanates typically emit considerably lower concentrations of isocyanate vapor than do toluene diisocyanates under the same conditions, the heat generated in reacting foam mass can create isocyanate vapor concentrations greater than the permissible level even from the polymerics. And it is not only the chemical vapor which is of concern, but also aerosols or mists generated from spraying operations. For this reason, precautions must be taken to protect personnel working with these systems.

Airborne isocyanates, at greater than allowed concentrations, are irritating to the eyes and to the respiratory tract, causing difficulty in breathing, chest discomfort, a productive cough and reduction in lung function. These effects can be immediate or delayed depending on the dose and the individual's tolerance to the chemical. Some individuals can become sensitized to isocyanates and experience severe asthma-like attacks whenever they are subsequently exposed to even minute amounts of isocyanate vapors. Sensitized individuals *must* be

prohibited from working with or near polyurethane foam systems and *must* be restricted from areas where they are used.

To minimize risk of sensitization in susceptible individuals, the Occupational Safety and Health Administration (OSHA) has promulgated a maximum allowable concentration (ceiling value) of 0.02 parts per million (pmm) for isocyanate vapor in air (see note below). Isocyanate vapor concentration in the workplace must be monitored by suitable monitoring equipment. Sufficient ventilation must be provided to maintain isocyanate vapor concentration below 0.02 ppm in all working areas. Local exhaust ventilation systems are recommended to move the vapors away from the operator and any other persons in the area. Where adequate local exhaust ventilation is not feasible, personal respiratory protection must be worn. Because the isocyanate odor threshold for most individuals is in the 0.2 to 0.4 ppm range, if isocyanate vapor can be smelled, the maximum allowable concentration has been exceeded and a hazardous condition ex-

NOTE: The American Conference of Government Industrial Hygienists (ACGIH) has adopted a Threshold Limit Value (TLV) of 0.005 ppm 8 hour time weighted average (TWA) and a 15-minute Short Term Exposure Limit (STEL) of 0.020 ppm for TDI.

During temporary periods of high vapor concentration (such as cleaning up spills, cleaning or repairing equipment, pouring or frothing in unventilated confined locations, etc.) respiratory protection must be worn. Cartridge or canister-type masks may be suitable for emergency use

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Ventilation, continued from page 2

during short exposures. During prolonged exposure or exposure to high concentrations of isocyanate vapor, adequate protection can be attained only through the use of positive-pressure air-supplied face masks or hoods, with air supplied from a tank (self-contained breathing apparatus) or from a diaphragm compressor located in an uncontaminated area.

During spray applications of polyurethane foam systems, whether outdoors, indoors or in a spray booth, positive-pressure air-supplied masks or hoods are mandatory. Cannister or cartridge-type respirators generally are not suitable for use during

spraying operations, because overspray and particulate mist tend to clog the filters and quickly render the respirators ineffective. Furthermore, cartridge respirators typically have no mechanism for warning the wearer that the filter is no longer effective. When the wearer can smell isocyanate, overexposure has occurred.

Smoking during pouring, frothing or spraying operations must be strictly prohibited. Certain solvents used in the operations and chlorofluorocarbons used as blowing agents can thermally decompose to highly toxic products when drawn through burning tobacco.

SKIN AND EYE PROTECTION

Isocyanates, and some of the catalysts used in polyurethane applications, can discolor the skin. Prolonged or repeated contact with polyurethane components may also lead to irritation, reddening, blistering, contact dermatitis, or skin sensitizations and should be avoided through the use of protective clothing and rubber gloves.

In spraying operations, because prevention of overspray is difficult, spray personnel should wear disposable coveralls, gloves, hoods and shoe protectors, in addition to the mandatory positive-pressure air-supplied mask or hood.

Liquid isocyanates splashed into the eyes can cause severe irritation, watering and transitory cor-

neal opacity similar to cataracts. Therefore, in operations where positive-pressure air-supplied mask or hoods are not required, all persons handling liquid polyurethane components in open containers must wear chemical-type safety goggles or face shields.

CAUTION: Ordinary safety goggles or face masks will not prevent eye irritation from high concentrations of isocyanate vapors.

Safety showers and eyewash fountains should be available at or near work stations where polyure-thane systems are handled or used, and personnel should be trained in their prompt use in an emergency.

FIRST AID

Persons who suffer an overexposure to polyurethane components by any route or contact should be examined by a physician as soon as possible.

Inhalation

Persons exhibiting symptoms of overexposure to isocyanate vapor or mist (severe coughing, tightness of chest, labored breathing), which may result from a major spill, must be removed immediately form the contaminated area and kept at rest until medical personnel arrive. If breathing is labored and oxygen inhalation equipment is available, oxygen should be administered by trained personnel. Obtain medical attention immediately.

Eye Contact

Should a liquid component come in direct contact

with the eyes, immediately flush with copious quantities of clean flowing water, preferably from an eyewash fountain, for at least 15 minutes. Obtain medical attention immediately.

Ingestion

Although highly improbable, if a polyurethane component is ingested accidently, have the affected person drink one or two glasses of milk or water. Obtain medical attention immediately. Do not give anything by mouth to an unconscious person. (Transfer at once to medical facility for gastric lavage.)

continued on page 4

First Aid, continued from page 3

Skin Contact

In case of minor contact, wash with soap and water. If a major contact occurs, remove contaminated clothing and shoes and wash the body with a safety shower or hose stream. Wipe affected areas with clean cloths saturated with rubbing alcohol, followed by soap and water. If swelling or reddening of the skin occurs, obtain medical attention. Decontaminate clothing before reuse by soaking in 8 percent ammonia solution for one hour prior to laundering with hot water and detergent. Discard

all contaminated leather goods, including all shoes, belts, and watchbands.

Medical Advice

The main hazard of TDI is from inhalation of vapor or aerosols. Asthmatic-type symptoms (broncho spasm) may develop and symptoms may be delayed for up to 12 hours. Treatment is essentially symptomatic. TDI is of low oral toxicity. In the unlikely event of ingestion, the hazard is from inhalation of the vapor during swallowing.

SPILLS AND WASTE

If isocyanate or an isocyanate catalyst blend is spilled, evacuate the area. Cleanup personnel must wear respiratory protection.

If a polyol or polyol catalyst blend is spilled, cover with an absorbent material such as sawdust and scoop up into open-top drums. Dispose of as ordinary industrial waste in compliance with pertinent regulations. Wash down area with aqueous detergent.

For isocyanate spills, cover with a dry oil-absorbent material. Scoop up and place in open-top drums. Remove to a safe outdoor area, and treat with a decontamination solution consisting of 90-95 parts water, 3-8 parts concentrated aqueous ammonia solution and 0.2-0.5 parts detergent, thoroughly mixed. Do not seal the drums. Allow the drums to stand for 72-96 hours and dispose of in compliance with pertinent regulations. Wash down spill area with aqueous detergent.

DISPOSAL OF WASTE COMPONENTS

The easiest and most convenient way to utilize surplus polyurethane components is to react the surplus polyol with isocyanate to produce a low quality foam. The foam produced can then be sold as a manufactured product. If surplus components are reacted to produce a foam that is intended to be discarded, EPA would then regulate the reaction of the surplus polyurethane components as on-site treatment of hazardous waste for which the company must obtain an appropriate permit in advance.

CAUTION: The reaction is exothermic which may cause spontaneous combustion (see Combustibility).

To dispose of waste isocyanate alone, reaction with liquid decontaminant is recommended. The waste isocyanate should be added slowly or in increments, under mechanical stirring, to the decontaminant contained in an open-top drum, under mechanical ventilation or out-doors. Allow the slurry to stand for 24-48 hours, decant the liquid and dispose of the solid material as ordinary industrial waste in compliance with pertinent regulations. TDI is listed as a hazardous waste under section 261.33(f) of EPA's Resource Conservation and Recovery Act (RCRA) and requires special handling for disposal.

DISPOSAL OF CONTAINERS

"Empty" isocyanate drums or other containers should be decontaminated by filling with water or decontamination solution, preferably outdoors. Allow to stand for 24-48 hours, open to the atmosphere. DO NOT SEAL DRUMS OR CONTAINERS. Drain the drums and puncture to prevent reuse if drums are to be sent to a scrap metal reclaimer. Otherwise, undamaged drums can be sent to drum reconditioners who will process the drums for reuse, typically converting closed-head, 18-gauge to open-top drums. Dispose of rinsate in

accordance with applicable federal, state, and local regulations.

CAUTION: Under no circumstance should empty drums be burned or cut open with an electric torch.

TDI is listed as a hazardous waste under section 261.33(f) of EPA's RCRA regulations and requires special handling for disposal. Polyol drums can be sent to drum reconditioners or disposed of as ordinary industrial waste in compliance with pertinent regulations.

COMBUSTIBILITY

During foaming operations and curing, foam temperatures may go above 140°C. To guard against the risk of spontaneous combustion resulting from exothermic heat retention, consult the supplier or product data sheet to determine the recommended thickness to be sprayed in a single application. Be sure all foam dispensing equipment is properly calibrated so that each component is applied within the ratio and tolerance specified by the material supplier. Smoking during pouring, frothing or spraying operations must be strictly prohibited. Avoid pouring, frothing or spraying activities near exposed lights, heating elements, open flame or while engaged in welding or similar "hot" activities. Fire suppression devices

should be readily available since flames can flash rapidly across the surface of foamed polyurethane, if ignited.

Polyurethane foams used as insulation require thermal protection from fire on the interior, such as one-half inch gypsum wallboard or the equivalent, unless fire testing demonstrates such thermal barriers are not needed. Consult the local building codes to determine applicable restrictions. Additionally, because polyurethane foams must generally be covered on the exterior with a coating or some other weather-resistant covering, applicators should follow the fire protections measures discussed above, or those provided by the supplier of the foam or covering material.

ADDITIONAL INFORMATION

Additional information on properties and safe handling of polyurethane systems can be obtained from the following sources:

- 1. Technical Data Sheets and Materials Safety Data Sheets (OSHA Form 20, or equivalent) from the system supplier.
- "Urethane Foams, Goods Practices for Employees' Health and Safety," U.S. Dept. of HEW, National Institute for Occupational Safety and Health, Division of Technical Services, Cincinnati, Ohio.
- 3. "Recommendations for the Handling of Toluene Diisocyanate," 1980, International Isocyanate Institute, 119 Cherryhill Road, Parsippany, N.J. 07054.
- 4. "Recommendations for the Handling of 4,4' Diphenylmethane Diisocyanate MDI

- Monomeric and Polymeric," 1982, International Isocyanate Institute, 119 Cherryhill Road, Parsippany, N.J. 07054.
- 5. "Fire Safety Guidelines for Use of Rigid Polyurethane or Polyisocyanurate Foam Insulation in Building Construction," Polyurethane Division, The Society of the Plastics Industry, Inc., 355 Lexington Ave., New York, N.Y. 10017.
- 6. "Fire Safety Guidelines on Flexible Polyurethane Foams Used in Upholstered Furniture and Bedding," Polyurethane Division, The Society of the Plastics Industry, Inc., 355 Lexington Ave., New York, N.Y. 10017.
- 7. "Using Flexible Polyurethane Foams Safely" Polyurethane Division, The Society of the Plastics Industry, Inc., 355 Lexington Ave., New York, N.Y. 10017.

This bulletin is intended to primarily address occupational health and safety precautions that should be taken to protect workers during foaming operations. The information herein is offered in good faith and believed to be true, but is made WITHOUT WARRANTY, EXPRESS OR IMPLIED, AS TO MERCHANTABILITY, FITNESS FOR A PARTICULAR PURPOSE OR ANY OTHER MATTER.

(U-111) March, 1980

USING FLEXIBLE POLYURETHANE FOAMS SAFELY

NOTE:

The enclosed information is based on available data up to the date of this bulletin. Manufacturers should be consulted on changes in technology which may permit different applications from those recommended in these guidelines. In no case are these guidelines to be considered as superseding any specific government regulations or customer specifications.

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USING FLEXIBLE POLYURETHANE FOAMS SAFELY

Introduction

In recent years, the production and uses of flexible polyurethane foams have expanded greatly. Because of their ease of fabrication, adaptability to styling, cleanliness and comfort, flexible polyurethane foams have become a dominant factor in providing cushioning for household products such as new and reupholstered furniture and bedding, often in combination with both natural and other synthetic materials. They are finding expanded uses in carpet cushioning, apparel and textiles, automobile padding, and in a number of industrial and other consumer products. The foams become component parts of the design and performance characteristics of the end products.

There are many different types of flexible polyurethane foams. They can be composed of various basic chemicals and additives, and they can be manufactured in a wide range of densities, all of which serve to provide a broad spectrum of properties. This aids in the selection of a foam specific to the needs of the end use.

All organic materials, both natural and synthetic, will burn if exposed to a sufficient heat source. Flexible polyurethane foams are organic materials and therefore will burn. When unmodified by combustion retardants, flexible foams are not normally prone to smoldering ignition. If ignited by an open flame, these foams, because of their low density open-celled structure, will burn more rapidly than denser materials, and some will produce a liquid "melt" which can cause downward propagation of flames.

By varying formulations and/or incorporating combustion retardant additives, the combustibility characteristics of flexible polyurethane foams can be altered to achieve varying degrees of resistance to ignition and spread of flame. But whether they contain combustion retardant additives or not, flexible polyurethane foams should be considered combustible.

The combustibility characteristics of a product containing flexible polyurethane foam, such as a piece of upholstered furniture, may be substantially different from the combustibility characteristics of the foam alone.

Selection of a foam specific to the needs of the end use, therefore, should take into account such factors as the type of ignition risk the product may be exposed to -- smoldering, small open flame, large open flame -- the fire risk characteristics of the occupancy in which it will be used, and the combustibility characteristics of other components of the product such as covering fabrics and interliners. Special foams designed for use in "high risk" areas are in various stages of development by a number of companies.

This booklet, based on fire research and experience, discusses uses of flexible polyurethane foams and considerations of their combustibility characteristics.

GENERAL USES OF FLEXIBLE POLYURETHANE FOAMS

To put the subject into perspective it is helpful to consider where and why flexible polyurethane foams are being used today.

Upholstered Furniture

The largest market for flexible polyurethane foams is in furniture construction where they are used as cushioning under a variety of fabrics or coverings. Desired shapes can be cut easily from large production slabs. Their excellent molding characteristics also permit them to be made into very intricately shaped parts. The foams can be produced in soft grades for seating or in firm grades for chair arm rests, depending on desired properties.

• Transportation

The second largest market is in seating and padding construction for the transportation industry. For example, in 1970, approximately 19 pounds of foam were used in the average passenger car. By 1975, this had increased to 30 pounds per car. Semiflexible foams are used as safety padding for instrument panels, head restraints, headliners, and arm rests, because of their low resiliency and high energy absorption properties. High resiliency (HR) foams have become the predominant type used in seating.

Bedding

Flexible polyurethane foams in bedding construction offer luxurious comfort and support. They are light in weight and can be made to controlled degrees of firmness. They have excellent resistance to chemical and age deterioration, and are readily sterilized. Mattress cores may be molded from large production slabs or may be molded to obtain special characteristics. Flexible polyurethane foams sometimes are used in composite with other materials, such as innersprings.

• Carpet Underlayment and Backing

Flexible polyurethane foams are used both as separate carpeting underlayment and as foam-backing on carpets. They can be lighter than, but as effective as, competitive materials. They are odor-free, have good tensile strength, are resistant to deterioration from moisture and insects, tend to accumulate less dust, and serve as noise and thermal insulation barriers.

• Apparel and Textiles

Certain flexible polyurethane foams can be bonded or laminated to almost any fabrics. In the apparel industry, flexible polyurethane foams are used for bonding and bond insulation between fabrics and linings. These foam-bonded and foam-laminated fabrics are easy to work with, are comfortable and wrinkle-resistant, provide warmth without significant weight and retain their shape.

• Industrial and Miscellaneous Uses

In addition to their many domestic uses, flexible polyurethane foams have a large number of industrial and other applications. These include their use as pipe insulation, filters in air filtration systems, as sound absorption mediums, as gaskets and seals, in paint applicators, as packaging materials and as components of toys.

OCCUPANCY CONSIDERATIONS

Where and how end products are to be used dictate different fire performance characteristics. Risks vary among various types of occupancies and even within certain occupancies.

The most common ignition sources of residential fires originating in bedding or furniture have been identified as cigarettes and other smoking materials. As a result, mattresses made in the United States must conform to Consumer Product Safety Commission Standard 16 CFR 1632 FF 4-72, a test in which lighted cigarettes are placed at key locations on the test mattress. While this test is deemed to provide consumer protection against ignition from such low intensity heat sources as smoldering cigarettes, it does not test resistance to open flame ignition nor predict the performance of mattresses once they become involved in actual fires. Any mattress comprising organic materials, natural or synthetic, will be consumed in a full-scale fire.

There is no comparable federal standard for furniture. However, the Consumer Product Safety Commission is considering a cigarette ignition standard and the Upholstered Furniture Action Council (UFAC) has established a program of voluntary construction standards designed to increase resistance to cigarette ignition.

In light of the fact that the polyurethane foams are such important components of these end products, the Urethane Division published, in 1977, a bulletin titled "Fire Safety Guidelines on Flexible Polyurethane Foams Used in Upholstered Furniture and Bedding," (U-106).

These guidelines, produced as a result of experience and fire testing, stated that design and testing of assemblies in which flexible polyurethane foams are used should take into account such factors as end uses (residential, commercial, transportation, places of public assembly, etc.) and fire protection measures employed (automatic detection and suppression, etc.).

Experience borne out by available statistical evidence indicates that combustibility performance standards for products in which flexible polyurethane foams or other combustible products are used should vary according to types of occupancies and certain other end use conditions.

For example, performance standards for products used in institutions and places of public assembly should be different than for products used in residences. Fires ignited by cigarettes or other smoking materials are the major concern regarding residential fire deaths. However, such factors as arson, limited mobility or limited means of exit may make open ignition of greater concern for institutional and public assembly usage.

Therefore, as an extension of the Fire Safety Guidelines, the Urethane Division of SPI established, in April 1979, the following positions concerning products in which flexible polyurethane foams are used:

Residential Occupancies

1. The federal standard 16 CFR 1632 FF 4-72 is an adequate test to determine resistance of a mattress to cigarette ignition, which has been determined to be the major cause of bedding fires. There is evidence that certain foams which pass the open flame ignition test required by California Bureau of Home Furnishings Bulletin 117 will provide mattresses with an additional degree of resistance to ignition by small open flames and cigarettes. However, flexible polyurethane foams, whether or not they contain flame retardants, may burn if subject to major open flame sources such as burning sheets and blankets.

- 2. The Urethane Division supports and encourages the efforts of the Upholstered Furniture Action Council in development of voluntary standards to cope with the problem of cigarette ignition which has been determined to be the major cause of furniture fires. In concert with the action of the Consumer Product Safety Commission, the Urethane Division reserves judgment on this program pending study. There is evidence that certain flexible polyurethane foams which pass the open flame ignition test required by California Bureau of Home Furnishings Bulletin 117 may provide an additional degree of resistance to ignition by small open flames and cigarettes. However, the ability of any piece of furniture to resist ignition will depend heavily on covering materials and construction methods used for the completed assembly.
- 3. All carpet installed in residential, commercial, and institutional occupancies in the United States is subject to the federal standard for the surface flammability of carpet and rugs 16 CFR 1630 FF 1-70 which specifies use of the methenamine pill test. It has been determined through room fire tests conducted by the National Bureau of Standards that carpet systems, including the underlayment, will not normally spread fire beyond the immediate vicinity of a burning object provided the carpet meets the requirements of FF 1-70. (Flame spread of carpet systems in room fires, NBSIR 76-1013, June 1976.) Care should be exercised not to expose flexible polyurethane foam underlayment to sources of ignition during the installation process.

Private Automobiles

4. The Department of Transportation open flame ignition test MVSS-302, which deals with the combustibility of interior furnishings of the automobile passenger compartment, generally recognizes that the systems can burn, but is concerned with establishment of a sufficiently low burning rate to allow egress time for vehicle occupants. The test's impact on death and/or injury rates due to interior automobile fires since its establishment in 1972 has not been determined. Continued support of enforcement of MVSS-302 is appropriate unless and until statistical evidence indicates otherwise.

Institutions and Places of Public Assembly

- 5. Performance standards or guidelines for mattresses and furnishings used in institutional buildings such as hospitals and nursing homes should take into account the risk of accidental open flame ignition.
- 6. Performance standards or guidelines for mattresses and furnishings used in detention and correctional institutions such as jails, prisons and penitentiaries should take into account the risk of intentional open flame ignition, or arson.

- 7. The Flooring Radiant Panel Test (NFPA Standard No. 253-1978; ASTM E-648) is appropriate for determining the ignition response of carpet and carpet assemblies (including flexible polyurethane foam backing) in exit/access corridors and enclosed exits of institutional and commercial buildings where these floor surfaces have been determined by the regulating authorities to be areas of unusual hazard. Care should be exercised not to expose flexible polyurethane foam underlayment to sources of ignition during the installation process.
- 8. Performance standards or guidelines for furnishings used in places of public assembly should take into account the fact that there may be a high density of population in relation to the number of exits, requiring measures to permit additional time for evacuation. Such standards should be more demanding than standards for residential uses.

Mass Transportation

9. Performance standards or guidelines for materials used in mass transportation should take into account that large numbers of people may be confined in a relatively small area with limited exits, requiring measures to permit additional time for evacuation, and that vandalism may be involved. Such standards should be more demanding than standards for private automobiles.

Member firms of the Urethane Division of The Society of the Plastics Industry, Inc. (SPI) are continually working to improve the combustibility characteristics of their products. The Urethane Division of SPI stands ready to work with appropriate government and industry groups in the development of performance standards or guidelines as they apply to products containing flexible polyurethane foams.

PRODUCT DESIGN AND ROLE OF COVERING MATERIALS

In evaluating the combustibility performances of flexible polyurethane foams, it is important to view the foams as components of end products, rather than just examining the characteristics of the foams alone.

Flexible polyurethane foams used in furniture and bedding constructions always require covering materials. The porous cellular surface of the foams can harbor dust which can increase their vulnerability to fire. Second, flexible polyurethane foams do not have abrasive-resistant surfaces to stand up to direct wear and tear. And, foams that are not covered will discolor relatively quickly in direct sunlight.

The weight and composition of covering materials can affect the resistance to ignition of the final assembled product, such as an upholstered cushion or mattress. There are two basic types of combustion, flaming and smoldering, and they are significantly different. Flaming combustion is the thermal oxidation of volatile gases such as illustrated by a burning Smoldering combustion is the thermal oxidation of solids, as illustrated by a burning cigarette. Tests have shown that when exposed to an open flame, wool as a covering material ignites only with difficulty, while cotton/acrylic combinations and thermoplastics can ignite relatively easily. Some cotton fabrics above 12 oz./yd. in weight will sustain smoldering, leading to delayed ignition of the product, while thermoplastic coverings will not smolder. This factor is significant because most fire fatalities result from smoldering type When smoldering fabric coverings or welt cords ignitions. provide high heat fluxes on foam cushioning, they will cause smoldering destruction of the foams. Hence, the covering material is the first line of defense against smoldering ignition from cigarettes in furniture construction.

The contamination of the covering materials also can affect its resistance to ignition. Household dust, cigarette ash, sugar or alcohol from spilled drinks, can have a "wicking" effect in transferring a fuel to the heat source, thus promoting further burning. Also, the application of wax polishes to coated fabric or plastic covers may make them more easily ignitable. Fabric and vinyl covers that are worn thin, scuffed, or torn, will reduce the resistance of upholstered furniture to catching fire if subjected to a heat source of sufficient intensity.

Large scale tests conducted by the British Rubber and Plastics Research Association (RAPRA) and the U.S. plastics industry have shown that selection of the covering materials and the design of the finished assembly are important considerations in the combustibility behavior of upholstered furniture. The tests showed that, when evaluated with potential risks, some assemblies might benefit from use of an interliner between foam and covering fabric. Such construction can help increase resistance to ignition and, if ignited, tend to reduce burning rate and generation of gases.

IGNITION TEMPERATURE AND FLAME SPREAD CHARACTERISTICS OF FLEXIBLE POLYURETHANE FOAMS

Although the combustion characteristics of flexible polyurethane foams, and the products in which they are used, can be altered by changing formulations and/or by including flame retardants and other additives in production, at the present stage of development, all urethane foams should be considered combustible under certain conditions and handled accordingly. Therefore, a brief review of the performance of urethane foams during the major steps of a "standard" fire scenario may be helpful.

Ignition performance traditionally has been evaluated by a series of small scale tests by the military, government agencies, the American Society for Testing and Materials (ASTM) and others. These tests, however, are not necessarily predictive of combustibility performance in actual fire situations. The behavior of any materials when exposed to measured heat sources in conditions of differing air movements or ventilation systems, humidity, occupancy, other component materials, etc., can be very different.

Ignition test results for flexible polyurethane foam can vary depending on chemical formulations, foam density, composition of materials, and the intensity of the heat source involved. Low density flexible foam with no flame retardant additives or fire protective covering material conceivably could ignite with even a relatively low flaming energy source. Higher density foams with flame retardant additives significantly reduce ease of ignition.

The ignition temperature of flexible polyurethane foam is in the range of $375\text{-}475^{\circ}$ C. The temperature must exceed 150° C. for a period of time before the occurrence of degradation, which may lead eventually to self-ignition. At this temperature most solid combustible material will exhibit signs of charring, one of the first steps in ignition.

The British Rubber Manufacturers' Association (BRMA) and others have found that flexible polyurethane foam can be exposed indefinitely to temperatures up to 105° C. without suffering any thermal degradation which could lead to the risk of fire. By comparison, the human skin can stand up to 60° C. before experiencing unendurable pain.

Thermal degradation depends on the temperature and the duration of exposure to that temperature. At 140° C., a temperature which will kill human beings, continuous exposure for about one month (over 700 hours) would be required to cause decomposition in flexible polyurethane foam which could lead to self-ignition.

When ignited by open flame, burning flexible polyurethane foams will develop highly localized temperature buildup relatively quickly for shorter periods of time compared with more dense materials such as wood, due to surface heat diffusivity. Tests by the BRMA and National Bureau of Standards have shown that ceiling temperatures recorded above a burning upholstered chair containing urethane foam ranged from 200 to 600°C., but only for a duration of from two to three minutes. Such time/temperature duration cycles normally would be insufficient to cause ceiling joists above to become ignited. However, most burning flexible polyurethane foams have a tendency to "flow" -- depending on their composition -- and can fuel a fire beneath or cause downward transference of ignition.

Many synthetic materials, flexible polyurethane foam being one, are not prone to smoldering unless in contact with severely smoldering fabrics, whereas most cellulosic materials, such as cotton or wood, will readily sustain smoldering combustion. Smoldering may lead to flaming after a considerable lapse of time following the initial ignition, (e.g. 1-2 hours).

MAJOR COMBUSTION PRODUCTS OF FLEXIBLE POLYURETHANE FOAM FIRES

Burning flexible foam usually produces smoke, a brown liquid "melt" which may continue burning after the heat source has been removed, and various gases. The most significant gas, in terms of life safety, is carbon monoxide, as with almost all burning organic materials, natural and synthetic.

Smoke

In the early stages of a fire, a limited amount of smoke can give a visible warning that something is wrong. However, a large volume of dense smoke presents a major hazard in that it can cause panic and disorientation and inhibit ability to escape. In addition, it causes people to choke and thus inhale larger quantities of toxic gases which will be present in the smoke. Suspended particles of matter produced by the burning is less likely to bring about death than asphyxiation (lack of oxygen), exposure to toxic gases, or intense heat.

BRMA conducted tests on burning upholstered furniture which included measurement of the time taken for smoke generation to reach dangerous levels in which victims might be trapped by smoke, cutting off an escape route. The period has been termed the "escape time" and is based on visibility limits determined by the Home Office Fire Inspectorate. An interior area is defined as "smoke logged" when visibility is reduced to 4.5 meters (14.8 feet).

The tests disclosed that the room escape time for flame-ignited chairs filled with polyurethane foams with a covering material was of a very similar order to those for chairs containing traditional material fillings. In completely closed rooms with no ventilation, smoke logging is likely to occur within one-half to eight minutes whether the chairs consisted of traditional or man-made materials. Under smoldering ignition conditions, which usually involve only traditional materials (plastics usually do not propagate fire by smoldering), smoke buildup takes considerably longer and escape time may be in the range of 20 to 70 minutes. However, this time lapse can be a hazard if it does not give sufficient warning of an incipient fire.

Toxic Gases

Until relatively recently, little detailed knowledge existed regarding the products of combustion of many natural materials widely used in the home. It is hardly surprising, therefore, that little was known about the combustion products given off by the newer man-made products. A number of research projects on the issue have been undertaken in the United States and Europe in recent years. Although much of the research is yet to be completed or published, some facts about these combustion products are known.

As of the time of printing of this booklet the National Bureau of Standards has stated that no standard test methodology is available to evaluate hazards presented by the toxic off-gases of real fires. However, NBS and other organizations are attempting to establish test methods designed to screen out potentially high hazard materials. Certain gases from burning polyurethanes and other common materials used in construction and furnishings are known. Their concentrations are highly dependent on the type of fire (flaming or smoldering) as well as the material involved.

Carbon Monoxide

Like most other plastics and natural materials, flexible polyurethane foams are carbon-based substances and, when burned, release carbon monoxide, a colorless and odorless gas. This is the most significant gas released in any fire atmosphere and is generally accepted as being the cause of the majority of deaths among victims from fire.

Pound for pound, burning cellulosics, such as cotton, and flexible polyurethane foams will release about the same total amount of carbon monoxide. Because the weight-to-volume ratio is lower for foams, the release rate may be greater but the total amount of carbon monoxide released by foams in a real fire situation may be no greater, and could well be less.

Carbon Dioxide

Carbon dioxide is produced when most organic materials are burned although the quantity will depend on such factors as the amount of moisture and oxygen. While non-toxic, carbon dioxide can cause asphyxiation due to depletion of oxygen. High concentrations also can increase the respiration rate which may lead to increased inhalation of other gases.

Nitrogen Oxide

Burning flexible polyurethane foam will release about the same amount of nitrogen oxides as the same quantity of wool, leather and nylon. However, the latter materials tend to release more nitrogen oxides at lower (600-700 C.) and higher (900-1,000 C.) temperature ranges, while flexible polyurethane foams release it at a more constant rate across the whole temperature spectrum.

Hydrogen Cyanide

Any organic material containing nitrogen will release hydrogen cyanide when burned under certain conditions. Wool, nylon and acrylics will generate several times more hydrogen cyanide than will the same weight of flexible polyurethane foams.

In fire tests sponsored by producers of component materials in the United States and the United Kingdom, hydrogen cyanide was generally not found to be a major hazard as a result of burning polyurethane foam.

Although test procedures to measure hydrogen cyanide still are under examination, the current consensus is that carbon monoxide and heat in actual fires probably will endanger human life before the hydrogen cyanide reaches hazardous levels.

Isocyanates

When flexible polyurethane foam burns, it can release very small quantities of isocyanates, a chemical used in the manufacture of the foam.

In a typical flexible polyether urethane foam, about 25 to 40 percent of the weight of the foam is contributed by the TDI (toluene di-isocyanate). However, test work has shown that when subjected to sufficient heat, such as a fire situation, a

maximum of only one percent of the weight of the polyurethane foam is likely to be evolved as bound isocyanate. Within that small percentage, very low levels of free TDI are likely to be evolved from fire.

The release of isocyanates is likely to occur in the early lower temperature stages of a fire. Experimental evidence to date indicates that as the temperature develops rapidly in a fire, the traces of isocyanates react with other combustion intermediates forming products which are likely to be stable up to much higher temperatures, and at this stage they could very likely react further to form relatively harmless gases such as carbon dioxide.

Other Gases

The introduction of compounds containing bromines or chlorines, or other chemicals, into flexible polyurethane foams to inhibit ignition and flame spread probably lead to production of hydrogen chloride and hydrogen bromide if these products become involved in full-scale fires. The present concensus is that the presence of hydrogen chloride and hydrogen bromide, while increasing the irritancy of smoke, would play only secondary roles, while carbon monoxide and heat will be the overriding life-safety risk. However, further examination of these gases is called for.

COMBUSTIBILITY STANDARDS, REGULATIONS AND TESTS

Standards and Regulations

As stated earlier, all mattresses sold in the United States are required to conform to Consumer Product Safety Commission Standard 1632 CFR FF4-72, "Flammability Standard for Mattresses."

At present, there are no federal standards governing the combustibility of upholstered furniture, although various proposals are under consideration at the Consumer Product Safety Commission.

Where no comparable federal standards exist, states are permitted to establish their own combustibility standards and regulations. The State of California Bureau of Home Furnishings has established an open flame test for components of upholstered furniture (Bulletin 117). In addition, a number of federal and state agencies have set combustibility standards and specifications for materials and products they purchase.

Combustibility Tests

In the fire testing of products, it is important to determine the combustibility behavior of the completed assembly. It is generally recognized that evaluating combustibility characteristics of the composites is much more complicated than examining the individual components because of the interactions of the great variety of combinations of padding and covering materials and configurations involved.

Small-scale laboratory tests have a function in identifying combustibility characteristics of materials. They should not be used to predict the behavior of an assembly in real fire situations unless a definite correlation between the test procedure and actual fire situations has been established on the basis of large-scale tests.

Fire tests sponsored by the producers of component materials have been conducted in the United States and in the United Kingdom. In general, these tests showed that the combustibility characteristics of an upholstered assembly varies according to types of coverings, configuration of the final assembly, formulation of the foam, and flame retardant additives.

More specifically the tests indicated:

- 1. Combustibility behavior of upholstered furniture is extremely varied and often depends more on the covering fabric than on the filling materials.
- In a comparison of upholstery filling materials, it was found that natural and SBR latex foam rubber tested burned faster and more intensely than polyurethane foam, which itself is consumed more rapidly than rubberized hair or wool flock. Foams containing flame retardant additives, and high resilient (HR) foams, generally are more difficult to ignite with a small ignition source.
- 3. When exposed to a small open flame, wool as a covering material ignites only with difficulty while cotton/acrylic combinations ignite relatively quickly. Polyurethane foam cushions with thermoplastic coverings displayed fire behavior similar to uncovered foam when the temperature of the ignition source was high enough to ignite or melt the covering. A covering of polyurethane/cotton fabric displayed the greatest fire retardation of those tested.
- 4. Using cigarettes as the ignition source did not result in ignition in either the thermoplastic covered or

uncovered polyurethane foam. When covered by a limited number of other fabrics, those foams containing flame retardant additives and the high resilient foams were superior in resistance to ignition compared to conventional polyurethane. However, with heavy density cellulosic fabrics, smoldering occurred which ultimately ignited the foam chair.

- 5. The use of certain interliners between covering and filling materials significantly increases resistance to ignition and, if ignited, tends to reduce the spread of flame.
- 6. Carbon monoxide was the most significant toxicant gas measured for all materials tested with the exception of the polyurethane foam containing no flame retardant additives. With the latter material, nitrogen oxides were more significant. Hydrogen cyanide was generally not found to be a major hazard as a result of burning polyurethane foam.

Additional Testing Needed

A great deal of work already has been done to understand and improve the combustibility performance of urethane foams, and small-scale fire tests of various materials have provided much useful information. Large-scale full room tests have shown that by using information generated in small-scale tests concerning fabrics, foam types, interliners and welting cords, furniture can be designed which will perform better in real fire environments than more conventional products. Further testing may be required to help in the development of combustibility codes and standards.

FLEXIBLE POLYURETHANE FOAMS AND SAFETY

A review of possible sources of fire accidents in the home should be helpful to an understanding of the safe use of products containing flexible polyurethane foams or any other combustible materials. Following are some typical examples:

Open Flames. Flames from gas stoves, gas heaters, oil heaters or open fires present a danger but often they are in a fixed position and protected by safety guards. Matches and cigarette lighters, while they are much smaller flame sources, are not in fixed positions and should be handled carefully.

Smokers' Materials. Cigarettes, cigars and pipes are the ignition source for most upholstery and bedding fires. Every precaution should be taken to check that no lighted smoking materials have been left burning where they might ignite combustible products.

Radiant Heaters. Radiant heaters and fireplaces, if located too close to furniture or beds, can cause fires. If mattresses or cushions become wet they should not be dried in front of an unattended radiant heater or open flame.

Electric Light Bulbs. Electric light bulbs can become very hot when they are switched on and the surface is not ventilated. Care should be taken to see that table or bedside lamps cannot be easily knocked over onto pillows, cushions or bedding. The folds of bedding and cushions can contain the surface heat of the bulb which could lead to a fire.

Spontaneous Combustion. There are no known problems of spontaneous combustion of flexible polyurethane foam in the home. This can only occur during the manufacturing process when in producing the cellular structure and curing the foam temperatures may go above 140°C. Even in the manufacturing process, however, spontaneous combustion is very uncommon, resulting from improper formulation, fabricating or storage techniques.

Safe Uses in the Home. Electric blankets are safe to use on polyurethane foam-filled mattresses provided they are used in accordance with the blanket manufacturers' instructions. Hot water and underfloor radiant heating systems do not become hot enough to present any fire risk. Sunlight ordinarily will not generate temperatures sufficiently high to ignite polyurethane foam in furniture or bedding unless magnified through a lens-shaped item.

Extinguishing Polyurethane Foam Fires. In burn test programs conducted by the BRMA no problems were experienced in extinguishing polyurethane foam fires. Water was found to be an efficient extinguishing agent for these fires. Soaking should be sufficient to prevent re-ignition.

Handling and Storing Flexible Polyurethane Foams

In its industrial uses, flexible polyurethane foam is likely to be uncovered and, when used as a process stock, stored in relatively large amounts in stores or working areas. This can present a potential fire hazard. Once ignited, these foams may melt to form flammable liquids which may spread flames rapidly and produce intense heat, dense smoke and toxic gases.

To protect against serious fires developing, raw foam and fabricated items should be stored indoors, away from fabricating operations, and be protected by automatic sprinklers. A bulletin issued by

The Factory Mutual System, "Storage of Flexible Polyurethane" (8-17S), provides recommendations on height of foam piles and sprinkler installation.

Ignition sources such as smoking materials, exposed lights, open flames and exposed heating elements should be kept away from storage and fabricating areas. Scrap foam should not be permitted to accumulate but should be disposed of promptly. Access aisles should be maintained between foam piles.

Should a fire break out, the burning foam should be drenched with copious amounts of water from a fire hose with a spray nozzle. Fire fighters should use self-contained breathing apparatus, as in all fires.

In addition to these specific suggestions, general fire safety recommendations that apply to other combustible materials also apply to the storage of flexible polyurethane foam.

References

- 1. "Urethane Plastics: A Status Report," Urethane Safety Group, The Society of the Plastics Industry, Inc., November 1974.
- 2. "Fire Safety Guidelines on Flexible Polyurethane Foams Used in Upholstered Furniture and Bedding," SPI Urethane Safety Group Bulletin (U106), The Society of the Plastics Industry, Inc., May 1977.
- 3. "Facts and Figures of the Plastics Industry -- 1977 Edition," The Society of the Plastics Industry, Inc., September 1977.
- 4. "Fifty Questions on Flexible Polyurethane Foam," British Rubber Manufacturers' Association.
- 5. "Flexible Polyurethane Foam: Its Uses and Misuses," British Rubber Manufacturers' Association.

PART A EMPLOYMENT AND POTENTIAL EXPOSURE PROFILE

9.01 Mark (X) the appropriate column to indicate whether your company maintains records on the following data elements for hourly and salaried workers. Specify for each data element the year in which you began maintaining records and the number of years the records for that data element are maintained. (Refer to the instructions for further explanation and an example.)

| Da | | intained for: | Year in Which | Number of |
|--|-------------------|---------------------|-----------------------|---------------------------------|
| Data Element | Hourly Workers | Salaried Workers | Data Collection Began | Years Records Are Maintained |
| Date of hire | x | Y | 1970 | INDEFINITELY |
| Age at hire | X | · x | 1970 | INDEFINITELY |
| Work history of individual | | | | |
| before employment at your | | | | INDEFINITELY |
| facility | <u> </u> | X | UK | INDEFINITEEL |
| Sex | X | X | 1970 | INDEFINITELY |
| Race | <u> </u> | <u> </u> | 1970 | INDEFINITELY |
| Job titles | X | Х | 1970 | INDEFINITELY |
| Start date for each job title | X | NA | 1970 | INDEFINITELY |
| End date for each job title | X | X | UK | INDEFINITELY |
| Work area industrial hygiene monitoring data | X | X | 1973 | 30 |
| Personal employee monitoring data | X | NA | 1973 | 30 |
| Employee medical history | X | X | 1978 | 30 |
| Employee smoking history | X | X | 1978 | INDEFINITELY |
| Accident history | X | X | 1965 | INDEFINITELY |
| Retirement date | X | X | 1970 | INDEFINITELY |
| Termination date | X | X | 1970 | INDEFINITELY |
| Vital status of retirees | NA | NA | NA NA | NA |
| Cause of death data | <u>NA</u> | NA | <u>NA</u> | NA |

| [_] | Mark | (X) | this | box | if | you | attach | a | continuation | sheet. |
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| .02 BI | In accordance with the in which you engage. | e instructions, complete | the following ta | ble for ea | ach activity |
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| _) | a. | b. | c. | d. | e. |
| | Activity | Process Category | Yearly Quantity (kg) | Total Vorkers | Total Worker-Hours |
| | Hanufacture of the | Enclosed | N/A | | |
| | listed substance | Controlled Release | N/A | | |
| | , | Open | N/A | | |
| | On-site use as | Enclosed | 0 | | |
| | reactant | Controlled Release | 142,083 | 6 | 2000 |
| | | 0pen | 0 | 0 | |
| | On-site use as nonreactant | Enclosed | N/A | | |
| | | Controlled Release | N/A | | |
| | | 0pen | N/A | | |
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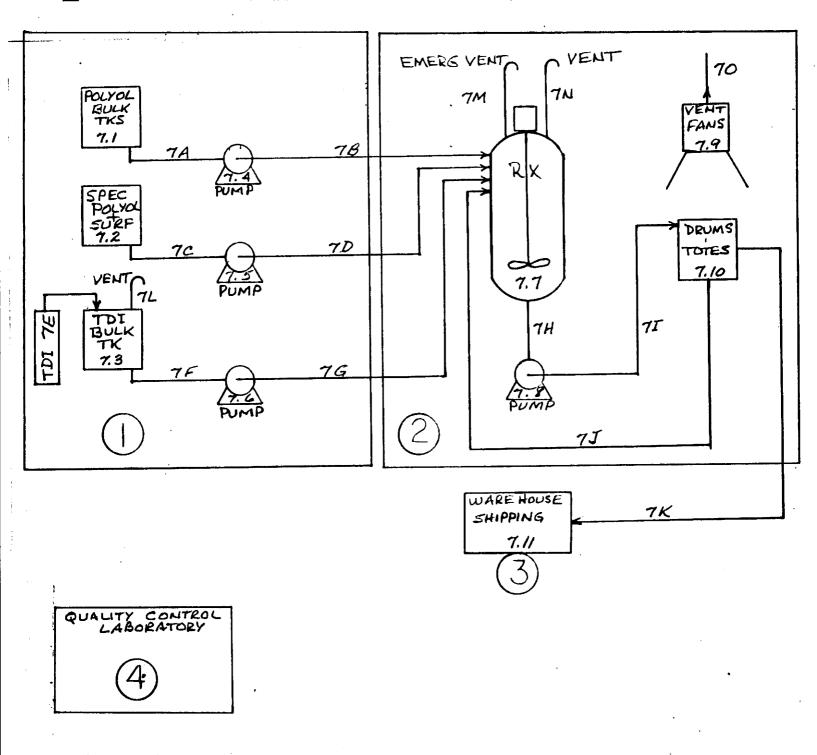
[] Mark (X) this box if you attach a continuation sheet.

| abor Category | Descriptive Job Title | |
|---------------|----------------------------|--------------|
| A | FOREMAN | , |
| 3 | CHEMICAL OPERATOR | |
| C | SHIPPING/RECEIVING LABORER | |
| D | LABORATORY TECHNICIAN ` | |
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9.04 In accordance with the instructions, provide your process block flow diagram(s) and indicate associated work areas.

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Process type TDI PREPOLYMER MANUFACTURING PROCESS



Mark (X) this box if you attach a continuation sheet.

| Process type | TDI PREPOLYMER MANUFACTURING PROCESS |
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| Work Area ID | Description of Work Areas and Worker Activities |
| 1 | Bulk receiving/Storage (Workers unload tank wagons) |
| · 2 | Reactor, drumming area (Worker operates equipment) |
| 3 | Warehouse/Shipping (Workers load drums into trucks) |
| 4 | Control lab (Technician checks product quality) |
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| | A,C | 2 | INHALATION | | GU | _A | 30 | | | |
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| | inclu SO = Solid | ides fumes, va <mark>l</mark> | oors, etc.) | | (specify phase, 90% water, | ases, e.g., 10% toluene) | | | | |
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| | D | 1 | INHALATION | | GU | С | 100 | | |
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| Work area | | |
| Labor Category | 8-hour TWA Exposure Level (ppm, mg/m, other-specify) | 15-Minute Peak Exposure Leve (ppm, mg/m, other-specify) |
| D | NA | LESS THAN 7 ppb |
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| B] | If you monitor worke | er exposur | e to the li | sted substa | nce, compl | ete the fo | llowing tabl |
|--------|--|------------------|------------------------------|------------------------------------|-----------------------------|-------------------------------|--|
| • | Sample/Test | Work Area ID | Testing Frequency (per year) | Number of Samples (per test) | Who Samples ¹ | Analyzed In-House (Y/N) | Number of Years Recor Maintained |
| | Personal breathing zone | 2,4 | 1 | 1 | <u>A</u> | Y | 30 |
| | General work area (air) | 1.2 | CONTINUOUS | SLY NA | <u>A</u> | <u>Y</u> | 30 |
| | Wipe samples | NA | NA | NA | NA | NA | NA |
| | Adhesive patches | NA | NA | NA | NA | NA | NA |
| | Blood samples | 1-4 | _1 | UK | D | N | 30 |
| • | Urine samples | 1-4 | 1 | UK | <u>D</u> | N | 30 |
| | Respiratory samples | NA | NA | _NA | NA | NA | NA. |
| | Allergy tests | 1-4 | 1 | UK | <u>D</u> | N | 30 |
| | Other (specify) | | | | | | |
| ر-، | COMPLETED PHYSICAL | 1-4 | 1 | 1 | D | N | 30 |
| | Other (specify) | | | | | | |
| | PULMONARY FUNCTION | 1-4 | 1 | 3 | D | N | 30 |
| | Other (specify) | | | | | | |
| •• | ¹ Use the following contains A = Plant industrials B = Insurance carriect C = OSHA consultant D = Other (specify) | l hygienis er | st | takes the | monitorin | g samples: | |

| | Sample Type | <u>s</u> | ampling and Analyt | ical Methodolog | Y |
|-------------|---|--|--|---|-------------|
| | PERSONAL ZONE | COLORIMETRIC T | APE/AIR PUMP | | |
| | GENERAL AREA (AIR) | CONTINUOUS REC | ORDING, COLORIMETE | RIC TAPE | |
| | BLOOD, URINE 3 | MOBILE MEDICAL | LABORATORY COLLEC | CTS | |
| | ALLERGY, PFT | AND ANALYZES A | T THE DIRECTION OF | THE | |
| | X-RAY | COMPANY MEDICA | L DOCTOR | | |
| 9.10 CBI | If you conduct pers specify the followi | onal and/or ambient ng information for Detection Limit | air monitoring fo each equipment typ Manufacturer | r the listed su e used. Averaging Time (hr) | bstance, |
| · | D | 0.001A | GMD SYSTEMS | 0.08 | 800-50 |
| | Н | 0.001A | MDA SCIENTIFIC | 8(VARIABLE) | 7005 |
| | Н | 0.001A | MDA SCIENTIFIC | 8(VARIABLE) | |
| | | | | | |
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| | | | | | |
| | D = Other (specify) Use the following (E = Stationary mon: F = Stationary mon: | | p ER TAPE ambient air monitor n work area n facility ant boundary | ring equipment | , |
| | H = Mobile monitor: I = Other (specify) | ing equipment (spec | ify) COLORIMETRIC | TAPE | |

| Test Desc | ription | (weekly, m | Frequency onthly, yearly, etc. |
|------------------------|---------|------------|--------------------------------|
| PULMONARY FUNCTION TES | T | YEARLY | |
| CHEST X-RAY | | YEARLY | |
| ALLERGY SENSITIVITY - | BLOOD | YEARLY | |
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| BI | Describe the engineering controls that you use to reduce or eliminate worker exposure to the listed substance. Photocopy this question and complete it separately for each process type and work area. | | | | | | | | |
|----|--|---------------------------|-------------------|-------------------|------------------|--|--|--|--|
| _1 | Process type | TDI PREPOL | YMER MANUFACTURIN | G PROCESS | | | | | |
| | Work area | • • • • • • • • • • • • • | | 1 | | | | | |
| | Engineering Controls | Used (Y/N) | Year Installed | Upgraded (Y/N) | Year Upgraded | | | | |
| | Ventilation: | | | | | | | | |
| | Local exhaust | N/A | N/A | N/A | N/A | | | | |
| | General dilution | <u> </u> | 1985 | <u> </u> | <u> N/A</u> | | | | |
| | Other (specify) | | | | | | | | |
| | | N/A | N/A | N/A | N/A | | | | |
| | Vessel emission controls | N | N/A | N/A | _N/A | | | | |
| | Mechanical loading or packaging equipment | N/A | N/A | N/A | N/A | | | | |
| | Other (specify) | | | | | | | | |
| | | N/A | N/A | N/A | N/A | | | | |

| [_] | Mark (X) this box if you attach a continuation sheet. | |
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| PART | PART C ENGINEERING CONTROLS | | | | | | | | |
|------|--|---------------------------|-------------------|-------------------|------------------|--|--|--|--|
| 9.12 | Describe the engineering controls that you use to reduce or eliminate worker exposure to the listed substance. Photocopy this question and complete it separately for each process type and work area. | | | | | | | | |
| CBI | | TO T DONO | | | | | | | |
| [_] | Process type | TOT PREPO | LYMER MANUFACTUR | NG PROCESS | | | | | |
| | Vork area | • • • • • • • • • • • • • | | 2 | | | | | |
| | Engineering Controls | Used (Y/N) | Year Installed | Upgraded (Y/N) | Year Upgraded | | | | |
| | Ventilation: | | | | | | | | |
| | Local exhaust | <u>Y</u> | 1985 | N | N/A | | | | |
| | General dilution | Y | 1985 | N/A | N/A | | | | |
| | Other (specify) | | | | | | | | |
| | | N/A | N/A | N/A | N/A | | | | |
| | Vessel emission controls | N | N/A | N/A | N/A | | | | |
| | Mechanical loading or packaging equipment | N/A | N/A | N/A | N/A | | | | |
| | Other (specify) | | | | | | | | |
| | | 1. | | 4 . | 4 | | | | |

RELOCATED EQUIPMENT TO NEW BUILDING IN 1985.

| [_] | Mark (X) this box if you attach a continuation sheet. | • |
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| | | |

| 9.12 CBI | Describe the engineering con to the listed substance. Ph process type and work area. | trols that yo otocopy this | u use to reduce of question and comp | r eliminate wor lete it separat | ker exposure ely for each | |
|-------------|--|-------------------------------|---|------------------------------------|------------------------------|--|
| 1_1 | Process type | TDI_PREPO | OLYMER MANUFACTUR | ING PROCESS | | |
| - | Work area | | | | | |
| | Engineering Controls | Used (Y/N) | Year Installed | Upgraded (Y/N) | Year Upgraded | |
| | Ventilation: | • | | | | |
| | Local exhaust | N | `N/A | <u> </u> | N/A | |
| | General dilution | <u> </u> | 1985 | N/A | N/A | |
| | Other (specify) | | | | | |
| | | N/A | N/A | N/A | N/A | |
| | Vessel emission controls | N/A | N/A | N/A | N/A | |
| | Mechanical loading or packaging equipment | Y | 1985 | N | N/A | |
| | Other (specify) | | | , | | |

RELOCATED EQUIPMENT TO NEW BUILDING IN 1985.

| [_] | Mark (X) | this box if you | attach a | continuation sheet. | |
|-----|----------|-----------------|----------|---------------------|--|
| | | _ | | | |

| DART | C | ENGINEERIN | G CONTROLS |
|------|---|------------|------------|
| | | | |

| process type and work area. | | | | |
|---|---------------|-------------------------------------|-------------------|------------------|
| Process type | TDI PR | EPOLYMER MANUFACT | TURING PROCESS | |
| Work area | | • • • • • • • • • • • • • • • • • • | 4 | |
| Engineering Controls | Used (Y/N) | Year Installed | Upgraded (Y/N) | Year Upgraded |
| Ventilation: | | | | |
| Local exhaust | Y | 1985 | N | N/A |
| General dilution | У | _1985 | N | N/A |
| Other (specify) | | | | |
| | N/A | N/A | N/A | N/A |
| Vessel emission controls | N/A | _N/A | N/A | N/A |
| Mechanical loading or packaging equipment | N/A | N/A | N/A | N/A |
| Other (specify) | | | | |
| | N/A | N/A | N/A | N/A |

RELOCATED EQUIPMENT TO NEW BUILDING IN 1985.

| | | | | | | , |
|-----|----------|-------------|------------|-----------------------|---|---|
| [_] | Mark (X) | this box if | you attach | a continuation sheet. | : | |
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| Process type TDI PREPOLYMER MANUFACTURING PRO | OCESS |
|---|---|
| Work area | ALL 1-4 |
| Equipment or Process Modification | Reduction in Worke Exposure Per Year (|
| All equipment relocated into new building in 1985. More | 10-20% |
| efficient use of existing equipment, improved physical | |
| arrangement and better use of ventialtion methods | |
| developed in predeeding years. Closed bulk system to transf | fer |
| F- | |
| TDI | |
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| CBI | ork area. ss type | FACTURING PROCESS | |
|-----|-------------------------|-------------------------|---------------------------------------|
| | area | | · · · · · · · · · · · · · · · · · · · |
| | Equipment Types | Vear or Use (Y/N) | |
| | Respirators | N | |
| | Safety goggles/glasses | <u> </u> | |
| | Face shields | N N | |
| | Coveralls | N | |
| | Bib aprons | N | |
| | Chemical-resistant glov | es Y | |
| | Other (specify) | | |
| | _N/A | | |
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[_] Mark (X) this box if you attach a continuation sheet.

| ork rea | Respirator Type N/A | • | Average Usage | Fit | Type of Fit Test ² | Frequency of Fit Tests (per year) |
|--|---|--|---|--|---|---|
| -4 | N/A | | | | | |
| | | | | | W-142707-0 | |
| | | | | | | |
| | | | | | | |
| <pre>= Other (sp se the follo L = Qualitat</pre> | pecify) owing codes to tive | designate | the type o | of fit tes | t: | |
| | | | | | | |
| | | | | | | |
| | | | | | | |
| | | | | | | |
| | = Daily = Weekly = Monthly = Once a ye = Other (space the follow) L = Qualitate | = Daily = Weekly = Monthly = Once a year = Other (specify) | <pre>= Daily = Weekly = Monthly = Once a year = Other (specify) se the following codes to designate L = Qualitative</pre> | <pre>= Daily = Weekly = Monthly = Once a year = Other (specify) se the following codes to designate the type of the code of th</pre> | <pre>= Weekly = Monthly = Once a year = Other (specify) se the following codes to designate the type of fit tes L = Qualitative</pre> | <pre>= Daily = Weekly = Monthly = Once a year = Other (specify) se the following codes to designate the type of fit test: L = Qualitative</pre> |

| 19 Describe all of the work eliminate worker exposure authorized workers, mark monitoring practices, pro question and complete it | to the listed su areas with warnin vide worker train | ostance (e.g. g signs, insu ing programs, | ., restrict en ure worker de , etc.). Pho | ntrance only to tection and tocopy this | | | |
|---|---|--|---|---|--|--|--|
| Process type <u>TDI</u> | Process type TDI PREPOLYMER MANUFACTURING PROCESS | | | | | | |
| Work area | | | | | | | |
| BULK UNLOADING - LIMITED A | ACCESS; WORKER TRA | INING MARKED, | COLOR CODED (| CONNECTIONS | | | |
| TDI STORAGE TANK - PLACARD | DED, CONTINUOUS AR | EA MONITOR, L | IMITED ACCESS | , TRAINING | | | |
| • | · · · · · · · · · · · · · · · · · · · | | | | | | |
| • | | | | | | | |
| Indicate (X) how often you leaks or spills of the list separately for each process type TDI | sted substance. It is type and work at PREPOLYMER MANUF. | Photocopy thing rea. ACTURING PROCESSION | s question ar | | | | |
| fleaks or spills of the list separately for each process. Process type TDI Work area | sted substance. It is type and work at PREPOLYMER MANUF. Less Than | Photocopy thing rea. ACTURING PROC | EESS 1 3-4 Times | More Than 4 | | | |
| Process type TDI Work area Housekeeping Tasks | sted substance. It is type and work at PREPOLYMER MANUF. | Photocopy thing each | s question ar | More Than 4 | | | |
| Process type TDI Work area | sted substance. It is type and work at type and work at the PREPOLYMER MANUF. Less Than Once Per Day | Photocopy thing PROCE ACTURING PROCE 1-2 Times Per Day | CESS 1 3-4 Times Per Day | More Than 4 | | | |
| Process type TDI Work area Housekeeping Tasks Sweeping | sted substance. It is stype and work at the prepolymer manuf. Less Than Once Per Day NA | Photocopy thing Process ACTURING PROCESS 1-2 Times Per Day NA | 3-4 Times Per Day NA | More Than 4 Times Per Da | | | |
| Process type TDI Work area Housekeeping Tasks Sweeping Vacuuming | sted substance. It is type and work at it is prepolymer manuf. Less Than Once Per Day NA NA | Photocopy thing Process ACTURING PROCESS 1-2 Times Per Day NA NA | 3-4 Times Per Day NA NA | More Than 4 Times Per Da NA NA | | | |
| Process type TDI Work area Housekeeping Tasks Sweeping Vacuuming Water flushing of floors | sted substance. It is type and work at it is prepolymer manuf. Less Than Once Per Day NA NA | Photocopy thing Process ACTURING PROCESS 1-2 Times Per Day NA NA | 3-4 Times Per Day NA NA | More Than 4 Times Per Da NA NA | | | |
| Process type TDI Work area Housekeeping Tasks Sweeping Vacuuming Vater flushing of floors Other (specify) | sted substance. It is type and work at type | Photocopy thing Process ACTURING PROCESS 1-2 Times Per Day NA NA NA | 3-4 Times Per Day NA NA NA | More Than 4 Times Per Da NA NA NA | | | |
| Process type TDI Work area Housekeeping Tasks Sweeping Vacuuming Vater flushing of floors Other (specify) | sted substance. It is type and work at type | Photocopy thing Process ACTURING PROCESS 1-2 Times Per Day NA NA NA | 3-4 Times Per Day NA NA NA | More Than 4 Times Per Da NA NA NA | | | |

| .19 Describe all of the work peliminate worker exposure authorized workers, mark a monitoring practices, program question and complete it s | to the listed su areas with warning vide worker train | ubstance (e.g. ng signs, insu ning programs, | , restrict en re worker de etc.). Pho | ntrance only to tection and tocopy this |
|---|---|--|---|--|
| Process type TD | I PREPOLYMER MAN | UFACURING PROC | CESS | |
| Work area | | | 2 | |
| AUTOMATIC EXPOSURE MONITORI | NG | ** | | |
| LIMITED ACCESS | | | | |
| TRAINING PROGRAM | | | | |
| CLOSED, DEDICATED PIPING | | | | |
| | | | | |
| fleaks or spills of the lisseparately for each process Process type TDI | sted substance. ss type and work PROPOLYMER MANU | Photocopy thi area. FACTURING PROC | s question ar | lean up routine nd complete it |
| fleaks or spills of the liss separately for each proces | sted substance. ss type and work PROPOLYMER MANU | Photocopy thi area. FACTURING PROC | s question ar CESS 2 3-4 Times | lean up routine nd complete it More Than 4 Times Per Da |
| Process type TDI Work area | sted substance. ss type and work PROPOLYMER MANU Less Than | Photocopy thi area. FACTURING PROC | s question ar CESS 2 3-4 Times | More Than 4 |
| fleaks or spills of the lisseparately for each process Process type TDI Work area | Less Than Once Per Day | Photocopy thi area. FACTURING PROC 1-2 Times Per Day | S question ar CESS 2 3-4 Times Per Day | More Than 4 |
| Process type TDI Work area Housekeeping Tasks Sweeping | Less Than Once Per Day | Photocopy thi area. FACTURING PROC. 1-2 Times Per Day NA | S question ar CESS 2 3-4 Times Per Day NA | More Than 4 Times Per Da |
| Process type TDI Work area Housekeeping Tasks Sweeping Vacuuming | Less Than Once Per Day NA | Photocopy thi area. FACTURING PROC 1-2 Times Per Day NA NA | S question are CESS 2 3-4 Times Per Day NA NA | More Than 4 Times Per Da |
| Process type TDI Work area Housekeeping Tasks Sweeping Vacuuming Vater flushing of floors | Less Than Once Per Day NA | Photocopy thi area. FACTURING PROC 1-2 Times Per Day NA NA | S question are CESS 2 3-4 Times Per Day NA NA | More Than 4 Times Per Da |
| Process type TDI Work area Housekeeping Tasks Sweeping Vacuuming Water flushing of floors Other (specify) | Less Than Once Per Day NA NA X | Photocopy thi area. FACTURING PROC 1-2 Times Per Day NA NA NA | S question are CESS 2 3-4 Times Per Day NA NA NA | More Than 4 Times Per Da NA NA NA |
| Process type TDI Work area Housekeeping Tasks Sweeping Vacuuming Water flushing of floors Other (specify) | Less Than Once Per Day NA NA X | Photocopy thi area. FACTURING PROC 1-2 Times Per Day NA NA NA | S question are CESS 2 3-4 Times Per Day NA NA NA | More Than 4 Times Per Da NA NA NA |
| Process type TDI Work area Housekeeping Tasks Sweeping Vacuuming Water flushing of floors Other (specify) | Less Than Once Per Day NA NA X | Photocopy thi area. FACTURING PROC 1-2 Times Per Day NA NA NA | S question are CESS 2 3-4 Times Per Day NA NA NA | More Than 4 Times Per Da NA NA NA |

| 3.19 3.19 | Describe all of the work practices and administrative controls used to reduce or eliminate worker exposure to the listed substance (e.g., restrict entrance only to authorized workers, mark areas with warning signs, insure worker detection and monitoring practices, provide worker training programs, etc.). Photocopy this question and complete it separately for each process type and work area. | | | | | | | |
|--------------|---|---|---|----------------------------|--------------------------------------|--|--|--|
| _] | Process type TDI PREPOLYMER MANFACTURING PROCESS Work area | | | | | | | |
| | | | | | | | | |
| | | | | | | | | |
| | WORKER TRAINING | | | | | | | |
| | CONTAINER INSPECTION FOR I | LEAKERS | | | | | | |
| | CONTAINER LABELS | | | | | | | |
| . 20 | Indicate (X) how often you leaks or spills of the lisseparately for each process. Process type TI Work area | sted substance. ss type and work DI PREPOLYMER MAN | Photocopy this area. | is question an | lean up routine nd complete it | | | |
| .20 | leaks or spills of the lis separately for each process Process type | ted substance. s type and work DI PREPOLYMER MAN Less Than | Photocopy this area. UFACTURING PF 1-2 Times | SOCESS 3-4 Times | More Than 4 | | | |
| .20 | leaks or spills of the lis separately for each proces Process type | sted substance. ss type and work DI PREPOLYMER MAN | Photocopy this area. SUFACTURING PR | is question an | nd complete it | | | |
| .20 | leaks or spills of the lisseparately for each process Process type TI Work area | ted substance. s type and work DI PREPOLYMER MAN Less Than Once Per Day | Photocopy this area. UFACTURING PR 1-2 Times Per Day | SOCESS 3-4 Times Per Day | More Than 4 | | | |
| . 20 | leaks or spills of the lis separately for each proces Process type | Less Than Once Per Day | Photocopy this area. UFACTURING PE 1-2 Times Per Day NA | 3-4 Times Per Day | More Than 4 Times Per Day | | | |
| .20 | leaks or spills of the lisseparately for each process Process type | Less Than Once Per Day NA | Photocopy this area. SUFACTURING PR 1-2 Times Per Day NA NA | 3-4 Times Per Day NA | More Than 4 Times Per Day NA NA | | | |
| .20 | leaks or spills of the lisseparately for each proces Process type TI Work area Housekeeping Tasks Sweeping Vacuuming Water flushing of floors | Less Than Once Per Day NA | Photocopy this area. SUFACTURING PR 1-2 Times Per Day NA NA | 3-4 Times Per Day NA | More Than 4 Times Per Day NA NA | | | |
| .20 | leaks or spills of the lisseparately for each process Process type | Less Than Once Per Day NA NA | Photocopy this area. SUFACTURING PROMISE Per Day NA NA NA | 3-4 Times Per Day NA NA NA | More Than 4 Times Per Day NA NA NA | | | |
| .20 | leaks or spills of the lisseparately for each process Process type | Less Than Once Per Day NA NA | Photocopy this area. SUFACTURING PROMISE Per Day NA NA NA | 3-4 Times Per Day NA NA NA | More Than 4 Times Per Day NA NA NA | | | |
| .20 | leaks or spills of the lisseparately for each process Process type | Less Than Once Per Day NA NA | Photocopy this area. SUFACTURING PROMISE Per Day NA NA NA | 3-4 Times Per Day NA NA NA | More Than 4 Times Per Da NA NA NA | | | |

| eliminate vauthorized monitoring question ar | worker exposure workers, mark a practices, prov | practices and add to the listed so areas with warning wide worker train separately for ea | ubstance (e.g ng signs, ins ning programs | ., restrict e ure worker de , etc.). Pho | ntrance only to tection and tocopy this |
|--|--|---|---|--|---|
|] Process typ | pe <u>TDI</u> | PREPOLYMER MANUF | ACTURING PROC | CESS | |
| Work area | | • | • • • • • • • • • • • | 4 | |
| WORKER TRAI | NING | | | | |
| SAMPLE LABE | | | | | |
| LIMITED ACC | | | | | |
| - | | | | | |
| | | | | | |
| separately | oills of the list for each proces | sted substance. ss type and work REPOLYMER MANUFAC | Photocopy thi | is question ar | |
| separately Process typ | oills of the list for each proces | sted substance. ss type and work | Photocopy this area. CTURING PROCES 1-2 Times | is question ar | Hore Than 4 |
| separately Process typ Work area | oills of the list for each proces | sted substance. ss type and work REPOLYMER MANUFAC Less Than | Photocopy this area. CTURING PROCES 1-2 Times | is question ar | Hore Than 4 |
| separately Process typ Work area . Housekeepin | oills of the list for each proces | sted substance. ss type and work REPOLYMER MANUFAC Less Than Once Per Day | Photocopy this area. CTURING PROCES 1-2 Times Per Day | 3-4 Times Per Day | Hore Than 4 |
| Separately Process typ Work area . Housekeepin Sweeping Vacuuming | oills of the list for each proces | ted substance. ss type and work REPOLYMER MANUFAC Less Than Once Per Day | Photocopy this area. CTURING PROCES 1-2 Times Per Day NA | 3-4 Times Per Day | More Than 4 Times Per Da |
| Separately Process typ Work area . Housekeepin Sweeping Vacuuming | oills of the list for each processe TDI PR | ted substance. Stype and work REPOLYMER MANUFACE Less Than Once Per Day NA NA | Photocopy this area. ETURING PROCES 1-2 Times Per Day NA NA | 3-4 Times Per Day NA | More Than 4 Times Per Da |
| Process typ Work area . Housekeepin Sweeping Vacuuming Water flush | ills of the list for each processor each processor ills of the list for each processor ills of the lis | ted substance. Stype and work REPOLYMER MANUFACE Less Than Once Per Day NA NA | Photocopy this area. ETURING PROCES 1-2 Times Per Day NA NA | 3-4 Times Per Day NA | More Than 4 Times Per Da |
| Process type Work area. Housekeeping Sweeping Vacuuming Vater flush Other (spec | ills of the list for each processor each processor ills of the list for each processor ills of the lis | Less Than Once Per Day NA NA | Photocopy this area. CTURING PROCES 1-2 Times Per Day NA NA NA | 3-4 Times Per Day NA NA | More Than 4 Times Per Da NA NA |
| Process type Work area. Housekeeping Sweeping Vacuuming Vater flush Other (spec | ills of the list for each processor each processor ills of the list for each processor ills of the lis | Less Than Once Per Day NA NA | Photocopy this area. CTURING PROCES 1-2 Times Per Day NA NA NA | 3-4 Times Per Day NA NA | More Than 4 Times Per Da NA NA |

| 9.21 | Do you have a written medical action plan for responding to routine or emergency exposure to the listed substance? | | | | | | | |
|---------|---|--|--|--|--|--|--|--|
| | Routine exposure | | | | | | | |
| | Yes | | | | | | | |
| | No 2 | | | | | | | |
| | Emergency exposure | | | | | | | |
| | Yes 1 | | | | | | | |
| | No 2 | | | | | | | |
| | If yes, where are copies of the plan maintained? | | | | | | | |
| | Routine exposure: | | | | | | | |
| | Emergency exposure: | | | | | | | |
| 9.22 | Do you have a written leak and spill cleanup plan that addresses the listed substance? Circle the appropriate response. | | | | | | | |
| | Yes | | | | | | | |
| | No 2 | | | | | | | |
| | If yes, where are copies of the plan maintained? PLANT MANAGERS OFFICE | | | | | | | |
| | Has this plan been coordinated with state or local government response organizations? Circle the appropriate response. | | | | | | | |
| | Yes | | | | | | | |
| | No 2 | | | | | | | |
| 9.23 | appropriate response. | | | | | | | |
| | Plant safety specialist | | | | | | | |
| | Insurance carrier | | | | | | | |
| | OSHA consultant | | | | | | | |
| | Other (specify) | | | | | | | |
| <u></u> | Mark (X) this box if you attach a continuation sheet. | | | | | | | |

SECTION 10 ENVIRONMENTAL RELEASE

General Instructions:

Complete Part E (questions 10.23-10.35) for each non-routine release involving the listed substance that occurred during the reporting year. Report on all releases that are equal to or greater than the listed substance's reportable quantity value, RQ, unless the release is federally permitted as defined in 42 U.S.C. 9601, or is specifically excluded under the definition of release as defined in 40 CFR 302.3(22). Reportable quantities are codified in 40 CFR Part 302. If the listed substance is not a hazardous substance under the Comprehensive Environmental Response, Compensation, and Liability Act of 1980 (CERCLA) and, thus, does not have an RQ, then report releases that exceed 2,270 kg. If such a substance however, is designated as a CERCLA hazardous substance, then report those releases that are equal to or greater than the RQ. The facility may have answered these questions or similar questions under the Agency's Accidental Release Information Program and may already have this information readily available. Assign a number to each release and use this number throughout this part to identify the release. Releases over more than a 24-hour period are not single releases, i.e., the release of a chemical substance equal to or greater than an RQ must be reported as a separate release for each 24-hour period the release exceeds the RQ.

For questions 10.25-10.35, answer the questions for each release identified in question 10.23. Photocopy these questions and complete them separately for each release.

| 10.01 | Where is your facility located? Circle all appropriate responses. |
|-------|---|
| CBI | · |
| 1_1 | Industrial area |
| | Urban area |
| | Residential area |
| | Agricultural area |
| | Rural area |
| r | Adjacent to a park or a recreational area |
| | Within 1 mile of a navigable waterway |
| | Within 1 mile of a school, university, hospital, or nursing home facility |
| | Within 1 mile of a non-navigable waterway |
| | Other (specify) |

| | is located) in terms of latitude (UTM) coordinates. | | | | | |
|--------------|---|--|--|-----------------------|--|-----------|
| | Latitude | • | 39 | • : | 37 , 18 | ' |
| | Longitude | • | 75 | • 5 | 1 , 21 | ' |
| | UTM coordinates Zone | e, No | orthing | , Ea | sting | |
| 10.03 | If you monitor meteorological corthe following information. | nditions in the v | icinity of | your faci | lity, provid | ie |
| | Average annual precipitation | • • • • • • • • • • • • • • • • | • • • | | inches/y | /ear |
| | Predominant wind direction | • • • • • • • • • • • • • • • • | • • • | | | |
| | | ·• | 24 | | | |
| 10.04 | Indicate the depth to groundwater | r below your facil | lity. | | | |
| | | | | | | |
| | Depth to groundwater | • | • • • | | meters | |
| 10.05 CBI | For each on-site activity listed, listed substance to the environme Y, N, and NA.) | , indicate (Y/N/N/ | A) all rout | ine relea ions for | uses of the | 1 of |
| | For each on-site activity listed, listed substance to the environme Y, N, and NA.) | , indicate (Y/N/N/ | A) all rout he instruct Environmen | ions for | ises of the a definition | |
| <u>CBI</u> | For each on-site activity listed, listed substance to the environment | , indicate (Y/N/N/ ent. (Refer to th | A) all rout he instruct Environmen | ions for tal Relea | ises of the a definition | |
| <u>CBI</u> | For each on-site activity listed, listed substance to the environme Y, N, and NA.) On-Site Activity | , indicate (Y/N/N/ent. (Refer to the Air | A) all rout he instruct Environmen | ions for tal Relea | ises of the a definition ase | |
| <u>CBI</u> | For each on-site activity listed, listed substance to the environme Y, N, and NA.) On-Site Activity Manufacturing | n indicate (Y/N/N/ent. (Refer to the Air | A) all rout he instruct Environmen NA | ions for tal Relea | ases of the a definition ase Land | |
| <u>CBI</u> | For each on-site activity listed, listed substance to the environment Y, N, and NA.) On-Site Activity Manufacturing Importing | n indicate (Y/N/NA) ent. (Refer to the Air NA) NA | A) all rout he instruct Environmen NA NA | ions for tal Relea | ases of the a definition ase Land NA NA | |
| <u>CBI</u> | For each on-site activity listed, listed substance to the environme Y, N, and NA.) On-Site Activity Manufacturing Importing Processing | nindicate (Y/N/NA ent. (Refer to the Air NA NA Y | A) all rout he instruct Environmen NA NA NA | ions for tal Relea | ases of the a definition ase Land NA NA | |
| <u>CBI</u> | For each on-site activity listed, listed substance to the environment Y, N, and NA.) On-Site Activity Manufacturing Importing Processing Otherwise used | Air NA NA Y NA | A) all rout he instruct Environmen NA NA NA NA NA | ions for tal Relea | nses of the a definition hase Land NA NA NA NA | |
| <u>CBI</u> | For each on-site activity listed, listed substance to the environment Y, N, and NA.) On-Site Activity Manufacturing Importing Processing Otherwise used Product or residual storage | nindicate (Y/N/NAent. (Refer to the NA NA Y NA | A) all rout he instruct Environmen NA NA NA NA NA NA NA NA NA N | ions for tal Relea | nses of the a definition ase Land NA NA NA NA NA NA NA NA | |
| <u>CBI</u> | For each on-site activity listed, listed substance to the environment Y, N, and NA.) On-Site Activity Manufacturing Importing Processing Otherwise used Product or residual storage Disposal | nindicate (Y/N/NA ent. (Refer to the Air NA NA Y NA NA NA NA NA NA NA | A) all rout he instruct Environmen NA NA NA NA NA NA NA NA NA N | ions for tal Relea | NA N | |
| <u>CBI</u> | For each on-site activity listed, listed substance to the environment Y, N, and NA.) On-Site Activity Manufacturing Importing Processing Otherwise used Product or residual storage Disposal | nindicate (Y/N/NA ent. (Refer to the Air NA NA Y NA NA NA NA NA NA NA | A) all rout he instruct Environmen NA NA NA NA NA NA NA NA NA N | ions for tal Relea | NA N | |

| 10.06 | Provide the following information for the listed of precision for each item. (Refer to the instrant example.) | substance and a uctions for fur | specify the level ther explanation and |
|-------|---|------------------------------------|---|
| CBI | | | |
| [_] | Quantity discharged to the air | 7 | kg/yr ± 20 % |
| | Quantity discharged in wastewaters | NA | kg/yr ± % |
| | Quantity managed as other waste in on-site treatment, storage, or disposal units | 900 | kg/yr ± 20 % |
| | Quantity managed as other waste in off-site | NA | kg/yr <u>+</u> % |

[_] Mark (X) this box if you attach a continuation sheet.

| Process type | TDI PREPOLYMER MANUFACTURING PROCE | SS |
|----------------|------------------------------------|-------------------|
| Stream ID Code | Control Technology | Percent Efficienc |
| 7L | NONE | |
| 7M | NONE | |
| 7N | NONE | |
| 7 ø | NONE | |
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| 10.09 <u>CBI</u> [_] | substance in residual tre | terms of a satment block not include a ., equipment | - Identify each emission point source containing the listed Stream ID Code as identified in your process block or flow diagram(s), and provide a description of each point raw material and product storage vents, or fugitive emission leaks). Photocopy this question and complete it separately |
|----------------------------|---------------------------|---|--|
| | Process type | <u>TD</u> | I PREPOLYMER MANUFACTURING PROCESS |
| | Point Source ID Code | | Description of Emission Point Source |
| | 7N | | REACTOR VENT |
| | 7Ø | | VENT FANS FOR CONTAINER FILLING |
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| 0 | B aissio 10.09 b | n Character y completin | ristics Ch ng the following | aracterize the | e emissions fo | or each Point : | Source ID Cod | | |
|---|-------------------------------|------------------------------|----------------------------------|----------------------------------|------------------------------------|---------------------------------|---|---|--|
| | Point Source ID Code | Physical State | Average Brissions (kg/day) | Frequency ² (days/yr) | Duration ³ (min/day) | Average Buission Factor | Maximum Dmission Rate (kg/min) | Maximum Emission Rate Prequency (events/yr) | Maximum Duission Rate Duration (min/event) |
| | <u>7N</u> | <u>v</u> | 0.0023 | 150 | 180 | 0.0000002 | 0.000012 | 150 | 180 |
| | <u>7Ø</u> | <u></u> | 0.000001 | 150 | 240 | 0.00000 000012 | 0.0000 00004 | 150 | 240 |
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| | ¹ Use th G = Ga | me following us; V = Vapo | g codes to des or; P = Partic | ignate physica ulate; A = Ae | al state at throsol; 0 = 0th | he point of re her (specify) | lease: | | |
| | ² Freque | ncy of eni | ssion at any 1 | evel of emiss | ion | | | | |

³Duration of emission at any level of emission

 $^{^4}$ Average Bmission Factor — Provide estimated (\pm 25 percent) emission factor (kg of emission per kg of production of listed substance)

|] | Point Source ID Code | Stack Height(m) | Stack Inner Diameter (at outlet) (m) | Exhaust Temperature (°C) | Emission Exit Velocity (m/sec) | Building Beight(m) | Building Width(m) ² | Ven t |
|---|-------------------------------|--------------------------|--------------------------------------|--------------------------------|--------------------------------|-----------------------|-----------------------------------|--------------|
| | 7N | | 0.051 | 25 | UK | 7.6 | 36.6 | V |
| | 7Ø | 8.2 | 0.2 | 25 | UK | 7.6 | 36.6 | V |
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| | l Waight o | f attached | or adjacent | L | | | | |
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| | | | r adjacent b | | • | | | |
| • | Use the i | following c | odes to desi | gnate vent t | ype: | | | |
| | H = Horia V = Verti | | | | • | | | |
| | V - VEI () | car | | | | | | • |
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| Point source ID code | |
|--------------------------|--|
| | |
| Size Range (microns) < 1 | Mass Fraction ($\chi \pm \chi$ precis |
| | |
| ≥ 1 to < 10 | |
| ≥ 10 to < 30 | |
| ≥ 30 to < 50 | |
| ≥ 50 to < 100 | |
| ≥ 100 to < 500 | |
| ≥ 500 | |
| | Total = 100% |
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| 10.13 Equipment Leaks — Complete the following table by providing the number of equipment types listed which are exposed to the listed substance and which are in service according to the specified weight percent of the listed substance passing through the component. Do this for each process type identified in your process block or residual treatment block flow diagram(s). Do not include equipment types that are not exposed to the listed substance. If this is a batch or intermittently operate process, give an overall percentage of time per year that the process type is exposed to the listed substance. Photocopy this question and complete it separate for each process type. | PART (| C FUGITIVE EMISSIONS | | 4 | | | | |
|---|------------|--|---|---|---|--|--|--|
| Process type TDI PREPOLYMER MANUFACTURING PROCESS | | types listed which are exp according to the specified the component. Do this fo residual treatment block f not exposed to the listed process, give an overall p exposed to the listed subs | osed to the l weight perce r each proces low diagram(s substance. I ercentage of | isted su nt of th s type i). Do n f this i time per | bstance a e listed dentified ot includ s a batch year tha | nd which substance in your e equipme or intert the pro | are in se passing process b nt types mittently cess type | rvice through lock or that are operated is |
| Number of Components in Service by Weight Percent of Listed Substance in Process Stream Less than 5% 5-10% 11-25% 26-75% 76-99% than 9 | <u>CBI</u> | for each process type. | | | | | | |
| Number of Components in Service by Weight Percent of Listed Substance in Process Stream Create than 5% 5-10% 11-25% 26-75% 76-99% than 9 | [_] | Process type TDI PRE | POLYMER MANUE | ACTURING | PROCESS | | | |
| Number of Components in Service by Weight Percent of Listed Substance in Process Stream Create than 5% 5-10% 11-25% 26-75% 76-99% than 9 | | | | | | | | |
| Compressor seals Compressor | | type | | • | | | | |
| Less | | | | | | | | |
| Pump seals¹ Packed | | Fauinment Tune | Less | | | | | Greater |
| Packed 0 0 0 2 0 0 Mechanical 0 0 0 0 0 0 0 0 Double mechanical² 0 < | | | than 3% | <u> </u> | 11-23% | 20-73% | 70-33% | than 777 |
| Mechanical 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 | | | 0 | Ω | 0 | 2 | 0 | 0 |
| Double mechanical | | | 0 | 0 | 0 | 0 | 0 | |
| Compressor seals¹ | | _ | 0 | 0 | <u> </u> | 0 | 0 | |
| Valves Gas³ 0 0 0 0 0 0 0 Liquid 0 0 0 0 8 0 2 Pressure relief devices⁴ 0 0 0 0 1 0 0 (Gas or vapor only) Sample connections Gas 0 0 0 0 0 0 0 Liquid 0 0 0 0 1 0 0 Open-ended lines⁵ (e.g., purge, vent) Gas 0 0 0 0 0 0 0 | | | 0 | | | | 0 | |
| Gas³ | | Flanges | 0 | 0 | 0 | 0 | 0 | 3 |
| Liquid 0 0 0 8 0 2 Pressure relief devices 0 0 0 0 1 0 0 0 0 0 0 0 0 0 0 0 0 0 0 | | Valves | | <u> </u> | | | | |
| Pressure relief devices 4 (Gas or vapor only) 0 0 0 1 0 0 0 Sample connections 0 0 0 0 0 0 0 0 Gas 0 0 0 0 1 0 0 Liquid 0 0 0 0 1 0 0 Open-ended lines 5 (e.g., purge, vent) Gas 0 0 0 0 0 0 0 0 | | Gas ³ | 0 | 0 | 0 | 0 | 0 | 0 |
| (Gas or vapor only) Sample connections Gas | | Liquid | 0 | 0 | 0 | 8 | | 2 |
| Gas 0 0 0 0 0 0 0 0 0 0 Liquid 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 | | | 0 | 0 | 0 | | 0 | 0 |
| Liquid 0 0 0 1 0 0 Open-ended lines ⁵ (e.g., purge, vent) Gas 0 0 0 0 0 0 0 | | Sample connections | | | | | | |
| Open-ended lines ⁵ (e.g., purge, vent) Gas 0 0 0 0 0 0 | | Gas | 0 | 0 | 0 | 0 | 0 | 0 |
| (e.g., purge, vent) Gas 0 0 0 0 0 0 | | Liquid | 0 | 0 | 0 | 1 | 0 | 0 |
| | | | | | | | | |
| <u>0 0 0 0 0 0</u> | | Gas | 0 | 0 | 0 | 0 | 0 | 0 |
| | | Liquid | 0 | _0 | 0 | 0 | 0 | 0 |

10.13 continued on next page

| | Mark | (X) | this | box | if | you | attach | a | continuation | sheet |
|--|------|-----|------|-----|----|-----|--------|---|--------------|-------|
|--|------|-----|------|-----|----|-----|--------|---|--------------|-------|

¹List the number of pump and compressor seals, rather than the number of pumps or compressors

| 10.13 | (continued) | | | | | | | | | | |
|--------------|---|--|---------------------|--|--|--|--|--|--|--|--|
| | greater than the pump stu will detect failure of th | If double mechanical seals are operated with the barrier (B) fluid at a pressure greater than the pump stuffing box pressure and/or equipped with a sensor (S) that will detect failure of the seal system, the barrier fluid system, or both, indicate with a "B" and/or an "S", respectively | | | | | | | | | |
| | ³ Conditions existing in th | e valve during norma | l operation | | | | | | | | |
| | ⁴ Report all pressure relie control devices | ef devices in service | , including those (| equipped with | | | | | | | |
| | ⁵ Lines closed during norma operations | al operation that wou | ld be used during (| maintenance | | | | | | | |
| 10.14 CBI | Pressure Relief Devices with Controls Complete the following table for those pressure relief devices identified in 10.13 to indicate which pressure relief devices in service are controlled. If a pressure relief device is not controlled, enter "None" under column c. | | | | | | | | | | |
| [_] | a. | b . | c. | d. | | | | | | | |
| | Number of Pressure Relief Devices | Percent Chemical in Vessel | Control Device | Estimated Control Efficiency ² | | | | | | | |
| | 1 | 26-75 | RUPTURE DISC | 100% | | | | | | | |
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| | Refer to the table in que heading entitled "Number of Substance" (e.g., <5%, 5- | of Components in Serv 10%, 11-25%, etc.) | vice by weight Perc | cent of Listed | | | | | | | |
| | The EPA assigns a control with rupture discs under a efficiency of 98 percent conditions | | AITIANC IND PPA B | issiblis a contloi | | | | | | | |

[] Mark (X) this box if you attach a continuation sheet.

| Process type | | • | TDI PREPOL | YMER MANUFAC | TURING PRO |
|---|---|---|------------|---|---|
| Equipment Type | Leak Detection Concentration (ppm or mg/m³) Measured at 60 Inches from Source | Detection Device | | Repairs Initiated (days after detection) | Repairs Complete (days aft initiated |
| Pump seals | | | | | |
| Packed | 0.02 PPM | FPM | DAILY | 1 | 3 |
| Mechanical | NA | | | | |
| Double mechanical | NA | | | | |
| Compressor seals | NA | | | | |
| Flanges | 0.02 PPM | FPM | DAILY | 1 | 3 |
| Valves | | | | | |
| Gas | NA | | | | |
| Liquid | 0.02 PPM | FPM | DAILY | 1 | 3 |
| Pressure relief devices (gas or vapor only) | NA | | | | |
| Sample connections | | | | | |
| Gas | NA | | | | |
| Liquid | 0.02 PPM | FPM | DAILY | 1 | 3 |
| Open-ended lines | | | | | |
| Gas | NA | | | | |
| Liquid | NA | | | | |

| Mark | <u>axt</u> | or resi | idual tres | itment block | TTOA GTSRESS | | 1 | 1 | | Operat- ing | • | | | | .* |
|------------------|------------|--|---|---|--|---|--------------------------------|--|---|---|--|---|--------------------------------------|-------------------------|--------------------------|
| k (x) thi | | Vessel Type | _ | Composition of Stored Materials | Throughput (liters per year) | | Filling | Vessel Inner Diameter (m) | Vessel Height (m) | Veccel | Vessel Emission Controls | Design Flow Rate | Vent Diameter (cm) | Control Efficiency (%) | Basis for Estimate |
| Tro Pau | | F | NA | 100 | 118940 | 70 | _60 | 2.74 | 3.81 | 2043 | 9_NA | <u>NA</u> | 5.1 | NA | NA |
| | | | | | | | | | | | | | | | |
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| • | · | 111- | | | | | | ²Us | · | ollowing | codes to | designa | ite floati | ing roof seal | ls: |
| tion snee | | P CIP NCIP EFR P H U | Pixed : Contact Noncon Extern Pressu Horizo Underg | t internal fl tact internal al floating i re vessel (in ntal round | loating roof I floating ro roof ndicate press | oof sure rati | ng) | MS MS UP UP VI VI VI | 11 = Me 22 = Sh 12R = Ri 11 = Li 12 = Ri 14 = Ve 11 = Ve 14 = Ve | chanical pe-mount quid-mount ather si por mount ather si | l shoe, proted second sed, second unted resided hield need second | imary ary ary lient fi ient fi ient fi | illed seal lled seal | | ls: |
| | | F CIF NCIF EFR P H U | Pixed : Contac : Noncon Extern Pressu Horizo Underg | roof t internal fl tact internal al floating i re vessel (in ntal round tht percent o | loating roof I floating re roof ndicate press f the listed | oof sure rati | ng) | MS MS UP UP VI VI VI | 11 = Me 22 = Sh 12R = Ri 11 = Li 12 = Ri 14 = Ve 11 = Ve 14 = Ve | chanical pe-mount quid-mount ather si por mount ather si | l shoe, proted second sed, second unted resided hield need second | imary ary ary lient fi ient fi ient fi | illed seal lled seal | l, primary , primary | · |
| rinuation sheet. | | F CIF NCIF EFR P H U | - Pixed: - Contac: - Noncon - Extern - Pressu - Horizo - Underg | roof t internal fl tact internal al floating i re vessel (in ntal round tht percent o loating roofs ow rate the e | loating roof I floating ro roof Indicate press If the listed I maission cont | oof sure rations substance crol device | ng) ce. Inclu ce vas des | MS MS MS LM LM LM VI VI VI de the to | 1 = Me 2 = Sh 2R = Ri 11 = Li 12 = Ri 12 = Ri 12 = Ri 14 = Ve 14 = Ve tal vola | chanical pe-mount quid-mount ather si por mount ather s atther s atther s | l shoe, priced second ed, second unted resided shield ed second hield ed second ed ed second ed ed second ed | imary ary lient fi ient fi ient fi ary | illed seal lled seal parenthes | l, primary , primary | ls: |
| | | F CIF NCIF EFR P H U | - Pixed: - Contac: - Noncon - Extern - Pressu - Horizo - Underg | roof t internal fl tact internal al floating i re vessel (in ntal round the percent of loating roofs ow rate the e- owing codes to | loating roof I floating ro roof Indicate press If the listed I maission cont | oof sure rations substance crol device | ng) ce. Inclu ce vas des | MS MS MS LM LM LM VI VI VI de the to | 1 = Me 2 = Sh 2R = Ri 11 = Li 12 = Ri 12 = Ri 12 = Ri 14 = Ve 14 = Ve tal vola | chanical pe-mount quid-mount ather si por mount ather s atther s atther s | l shoe, priced second ed, second unted resided shield ed second hield ed second ed ed second ed ed second ed | imary ary lient fi ient fi ient fi ary | illed seal lled seal parenthes | l, primary , primary | ls: |
| | | F CIF NCIF EFR P H U | - Pixed: - Contac: - Noncon - Extern - Pressu - Horizo - Underg | roof t internal fl tact internal al floating i re vessel (in ntal round the percent of loating roofs ow rate the e- owing codes to | loating roof I floating ro roof Indicate press If the listed I maission cont | oof sure rations substance crol device | ng) ce. Inclu ce vas des | MS MS MS LM LM LM VI VI VI de the to | 1 = Me 2 = Sh 2R = Ri 11 = Li 12 = Ri 12 = Ri 12 = Ri 14 = Ve 14 = Ve tal vola | chanical pe-mount quid-mount ather si por mount ather s atther s atther s | l shoe, priced second ed, second unted resided shield ed second hield ed second ed ed second ed ed second ed | imary ary lient fi ient fi ient fi ary | illed seal lled seal parenthes | l, primary , primary | ls: |
| | | F CIF NCIF EFR P H U | - Pixed: - Contac: - Noncon - Extern - Pressu - Horizo - Underg | roof t internal fl tact internal al floating i re vessel (in ntal round the percent of loating roofs ow rate the e- owing codes to | loating roof I floating ro roof Indicate press If the listed I maission cont | oof sure rations substance crol device | ng) ce. Inclu ce vas des | MS MS MS LM LM LM VI VI VI de the to | 1 = Me 2 = Sh 2R = Ri 11 = Li 12 = Ri 12 = Ri 12 = Ri 14 = Ve 14 = Ve tal vola | chanical pe-mount quid-mount ather si por mount ather s atther s atther s | l shoe, priced second ed, second unted resided shield ed second hield ed second ed ed second ed ed second ed | imary ary lient fi ient fi ient fi ary | illed seal lled seal parenthes | l, primary , primary | ls: |

| DADT | r | NON | DOIPTING | RELEASES |
|------|---|-----|----------|----------|

| 10.23 | Indicate the date and time when the release occurred and when the release ceas | ed or |
|-------|--|-------|
| | was stopped. If there were more than six releases, attach a continuation shee | t and |
| | list all releases. | |

| Release | Date Started | Time (am/pm) | Date Stopped | Time (am/pm) |
|---------|--|--------------|-----------------|-----------------|
| 1 | NONE | | | |
| 2 | | | | |
| 3 | | | | |
| 4 | | | | |
| 5 | | | | |
| 6 | ************************************** | | | |

10.24 Specify the weather conditions at the time of each release.

| Release | Wind Speed (km/hr) | Wind Direction | Humidity (%) | Temperature (°C) | Precipitation (Y/N) |
|----------|--------------------|-------------------|--|--|---------------------|
| 1 | | | • | | |
| 2 | | | | | |
| 3 | | | ************************************** | ************************************** | |
| <u>4</u> | | | | | |
| 5 | | | | | |
| 6 | | | | | |

| APPENDIX I: List of Continuation Sheet | APPENDIX | I: | List | of | Continuation | Sheet |
|--|-----------------|----|------|----|--------------|-------|
|--|-----------------|----|------|----|--------------|-------|

Attach continuation sheets for sections of this form and optional information after this page. In column 1, clearly identify the continuation sheet by listing the question number to which it relates. In column 2, enter the inclusive page numbers of the continuation sheet for each question number.

| Question Number (1) | | Sheet Page Number (2) |
|---------------------|-------------|--|
| 1.04 B | <u> </u> | 1 |
| 4.02 | | |
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